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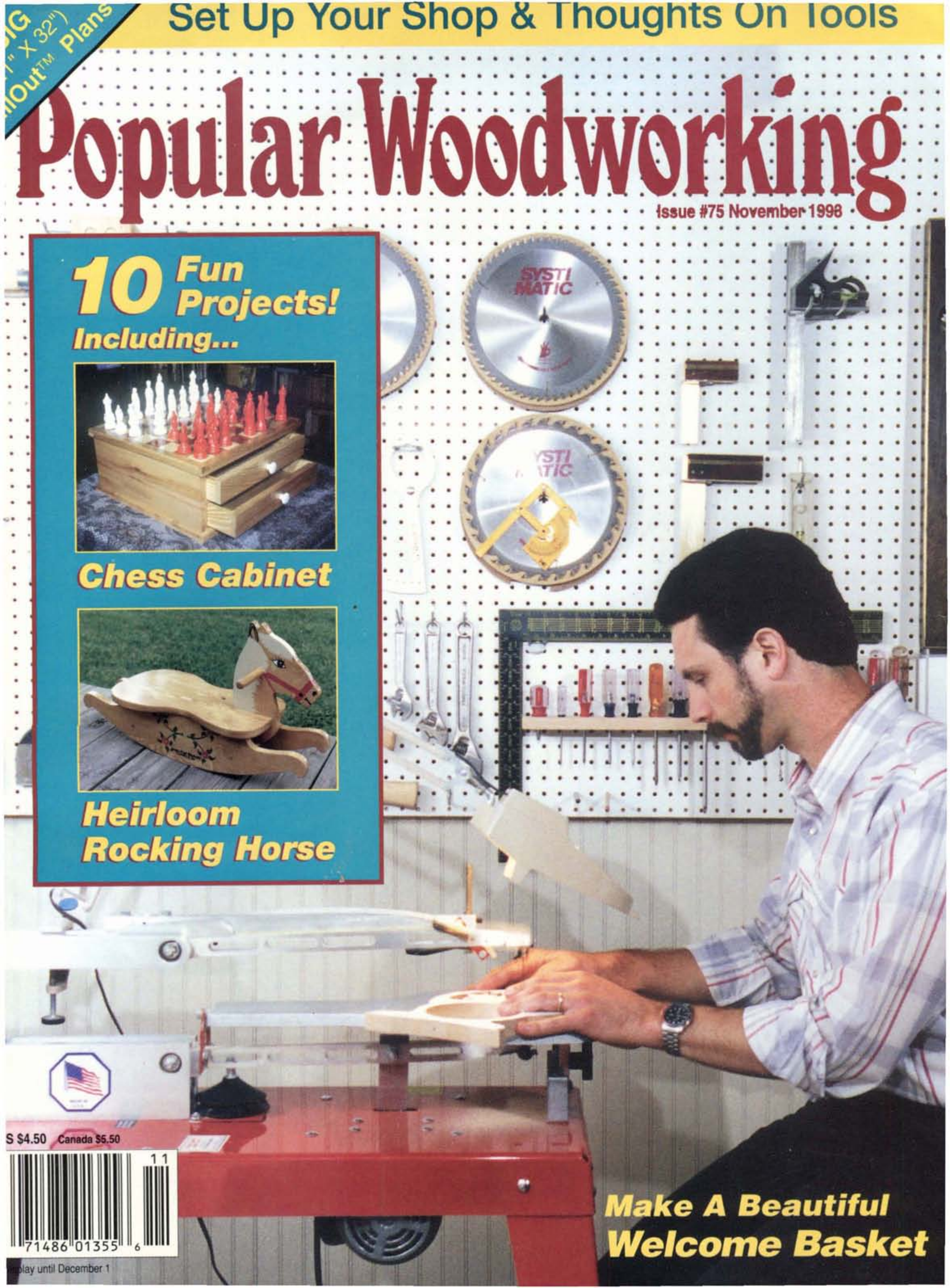
Set Up Your Shop & Thoughts On Tools

Popular Woodworking

Issue #75 November 1998



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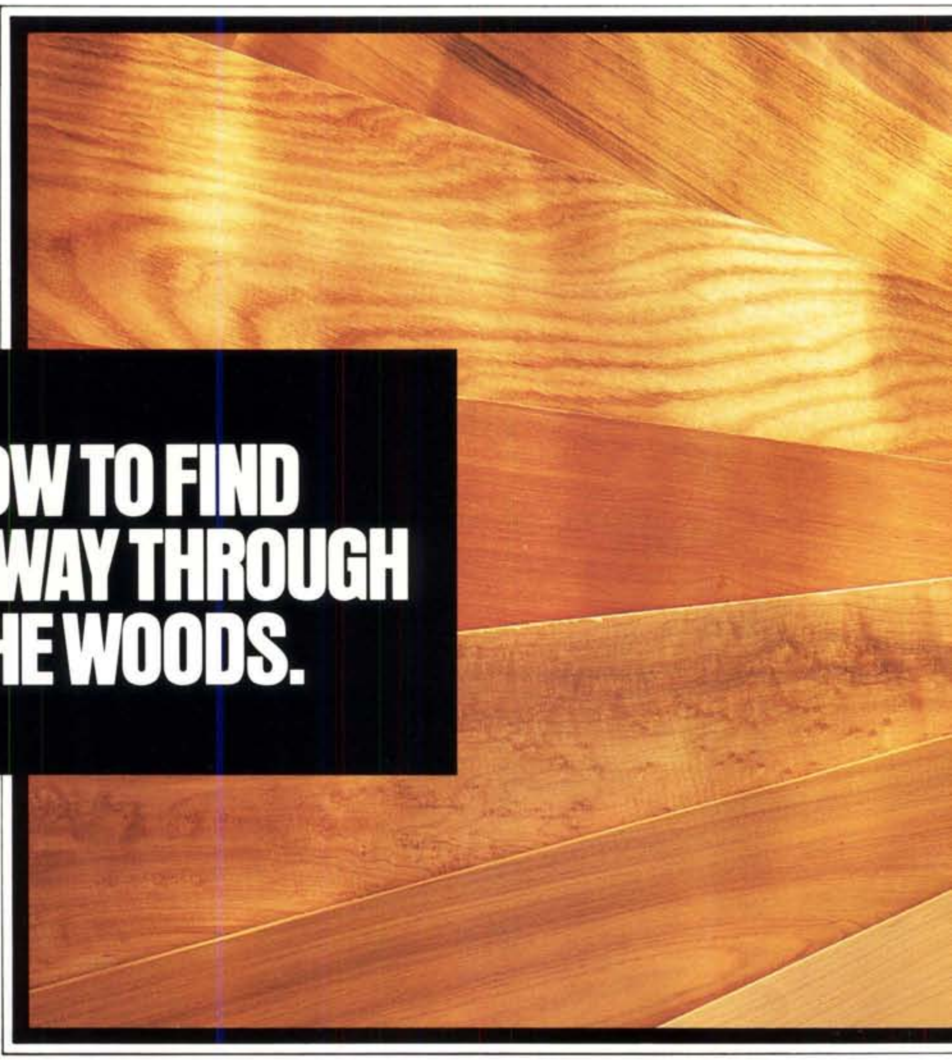
HOW TO FIND YOUR WAY THROUGH THE WOODS.

In woodworking, every project is an adventure. You explore the wood, studying its grain, searching for something hidden within. Your goal is to emerge, weeks later, with a proud souvenir. A planter. A Shaker chair. Or perhaps a rustic chest of drawers.

Ironically, the ease of any woodland journey depends largely on a decision you make *before* embarking: your choice of tools. To this end, a move in the right direction is Skil Woodshop Tools.™

Skil Woodshop Tools are a full line of woodworking tools designed to make any project a pleasure. Every step of the way.



Enter the woods with a confident first cut on the 3400 10″ benchtop tablesaw. Its powerful 13.0 amp motor and the exclusive Accu-Lign™ self-aligning, quick-set rip fence makes short work of sizing raw stock.

Afterward, smooth off cuts and round corners with the 3370 combination 4″ belt/6″ disc benchtop sander. A quick-release belt adjustment (another Skil exclusive) lets you effortlessly switch between vertical and horizontal bed positions.

If your plans call for intricate cuts, use the 3330 16″ benchtop scroll saw. It accepts either plain or pin-

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end blades and comes with a built-in blade length gauge for quick setting. Plus, to keep your cutting path clean, it has a high-velocity dust blower.

To navigate tricky interior cuts, there's the 4395 jigsaw. With a choice of vari-orbit, auto scroll and straight-line cutting modes, it offers more options than any other jigsaw.

And for accurate, repetitive drilling, the 3380 benchtop drill press is precisely what you need. The depth measurement and sturdy, adjustable table guarantee consistency from first hole to last.

Of course, you could just let your imagination run wild with the HD 1875 plunge router.

The 2¼ hp motor carves signs, cuts joints and trims decorative edges with power to spare.

When it's time for assembly, try the innovative HD 1605 plate joiner. Simply cut matching slots, pop in a wooden biscuit, glue and you have yourself a quick, durable joint.

Once it's all together, give your project a once over with the HD 7576 palm grip sander. The 7576 performs an exacting 1/16″ orbit 13,000 times a minute for a fast finish.

Next time you explore the woods, bring along the perfect traveling companions—Skil Woodshop Tools. You'll find those shown here and other Woodshop tools in stores everywhere. Just look for this label.

SKIL® WOODSHOP TOOLS

It's a sure sign you're on the road to woodworking success.

SKIL®

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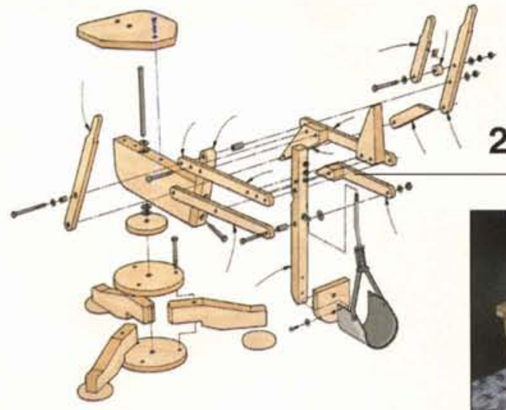

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We don't know where Bob gets his stuff, but he's certainly dreaming up some weird 'toons. See what he did with his pen and watercolors on page 97.

On the Cover

Rick Longabaugh and his wife Karen live in Centralia, Washington, where they own The Berry Basket—a mail order company specializing in unique woodworking patterns. Rick and Karen have also self-published two books on collapsible basket patterns. See the "Welcome Basket" that Rick designed especially for *Popular Woodworking* on page 59. We know you'll enjoy making it.

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The Power Of Nature

As I sit and write this piece, my family and I are just back from a vacation that included Yosemite National Park. And at this same point in time, Des Moines, Iowa (and much of the Midwest) is under several feet of water.

Yosemite was in full splendor. Thanks to the first normal winter in six years, all the waterfalls are running at capacity with the chilly runoff from fresh snowmelt. The park was alive with several species of birds, squirrels, chipmunks, deer and foreign tourists—we didn't see any bears.

We parked the van in the lot by Bridalveil Fall and hiked up the trail to see this magnificent work of nature. When we got there we couldn't see a thing—the sky was totally obscured by a chilly, dense mist. The mist felt wonderful on this 90° day, but we had to back away from the falls to see anything. The photo to the right is yours truly beside the stream that carries away this fallen water.

As we traveled along, Half Dome came into view. So well photographed by Ansel Adams, Half Dome looks like a chunk of the moon that has fallen to earth. The girls all wanted to climb to the top until we got a little closer and it became evident how big that rock really is—it rises nearly a mile above the valley floor.

We parked again, walked to the local eatery, then ventured off to see Yosemite Falls. Again, beauty. The upper fall plummets in several cascades to a lower fall that drops to the valley floor for a total of 2425 feet. We saw the place beside Yosemite Creek where John Muir had built a cabin of sugar pine and stayed for two seasons. What a wonderful time that must have been.

On our way out of the park, we stopped alongside the road in front of El Capitan, a solid granite wall that rises vertically more than 3600 feet above the meadow. The kids used binoculars to find climbers clinging to the shear wall as they worked their way to the top. I watched one fellow as he pulled himself up and over the final ledge—he looked an eighth of an inch tall through the 10X lenses. I couldn't see him without the binoculars. What a triumph he must have experienced.

Standing a few hundred yards away from that granite wall, I was struck by the shear enormity of nature and the minuscule being of self. Our great significance can only be what we assign to ourselves. We're all very privileged to inhabit this awesome place.

But awesome can also be overpowering. There's been a tremendous amount of water dropped on the Midwest this summer in storm after storm. At roughly 8 lb/gal, it's difficult to imagine the total forces exerted with all this water—we just can't comprehend how many gallons have fallen. The destruction isn't incomprehensible, we've all watched levee after levee slowly succumb with a gentle but unstoppable perseverance. Like standing in front of El Capitan, the calamity is huge and the people so small. The climber who stood at the top with upraised arms probably had a few scrapes, cuts and bruises to show for his trip, and maybe he knew of someone who never reached the summit, but he persevered and made it. Hang in there Midwest.

To all of you who have been affected by the floods of '93, we here at *Popular Woodworking* wish you, your families and loved ones a speedy trip to the top with a minimum of scrapes, cuts and bruises. To the staffs and families of *Wood* and *Woodsmith*, both located in Des Moines, our hearts are with you—Godspeed.

Rob

Safety Note

Safety is your responsibility. The manufacturers place safety devices on their equipment for a reason. In most of the photos you see in *PW*, these have been removed to provide clarity. In some cases we'll use an awkward body position so you can better see what's being demonstrated. Please don't copy us. Think about each procedure you're going to perform beforehand. Think ahead.

Letters

We welcome your comments, pro or con, about articles we publish. Send your letters to: Editor, *Popular Woodworking*, 1041 Shary Circle, Concord, CA 94518. Letters may be edited for publication.

Do They Care?

Over the years I have purchased a wide variety of power tools in which the manufacturers required me to send in a registration card to activate the warranty. This practice is common for other products as well. In all these years, there have only been two companies that have contacted me for a follow–up on their product. They are Chrysler Corporation and Ethan Allen. It would seem to me that if a company wants to make a better product to match consumer needs, they should survey the people who use them.

Stephen F. Smutek
Tappan, New York

Legally, you don't have to return the warranty card, the sales slip verifies the item and purchase date if you need to return the tool for service. Along with registering the buyer, companies use the returned cards to develop demographics; that is, what type of people (hot rodders, fishermen, etc.) buy what type of tool (table saws vs. cordless drills), so they know where to target their advertising. The cards are also used to notify owners of recalled items. And of course, your name, unless you requested otherwise, may be sold to other manufacturers or marketing firms. One manufacturer told me that it's easy to keep on top of any problems that might develop with a particular line because just about anyone who has a defective tool either writes, phones or faxes. They take these very seriously. He said they hardly ever hear from their satisfied customers. As far as improving tools, a lot of the companies test their tools with heavy–duty users under actual conditions. If they break, they find out why real quick and hopefully fix it.

—The Editors

Marvin Malicki of Marietta, Georgia built Bob Calvert's "Uncle Sam Whirligig" featured in the July, 1992 issue just in time for the 4th this year. He made Mylar™ templates he'd be glad to share with you readers. If anyone is interested, let me know—we'll see what we can do.

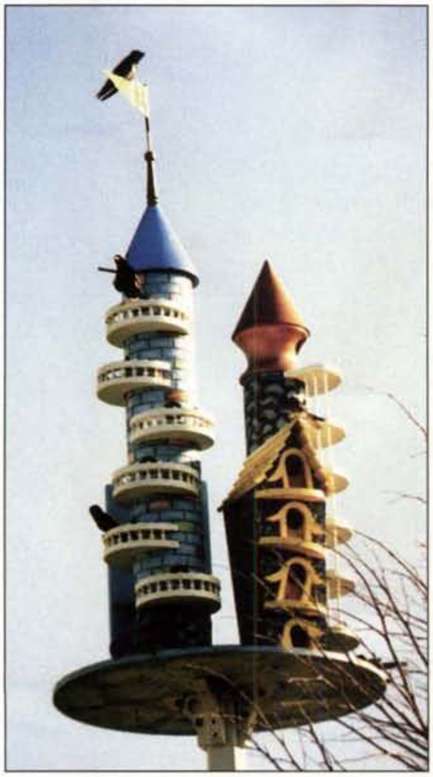
—The Editors

Howard French's "Old Mill Wheel" from September, 1992 still brings in the photos. Arthur Hamel of Wildwood, Florida worked on this one and the pond for six months. He spent a lot of time tuning up the whole system, but says, "the fish are healthy and the plants are growing."

—The Editors

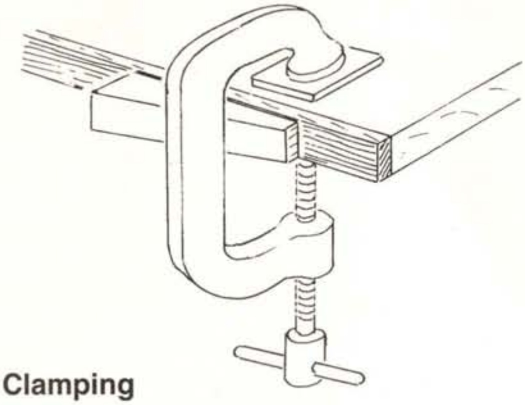
Edward Summers of Palmetto, Florida wrote to say he's been building storybook birdhouses since 1951. It looks like he's turned it into an art. His birdhouses look a lot more interesting than the one we did in our July issue. We'd certainly like to see a set of plans for one of them.

—The Editors



Tricks of the Trade

Tricks of the Trade shares readers tips for making woodworking tasks easier and safer. Send your original, unpublished ideas to Tricks of the Trade, % Popular Woodworking, 1041 Shary Circle, Concord, CA 94518. We pay $25 for each TOT we publish.



Edge Clamping

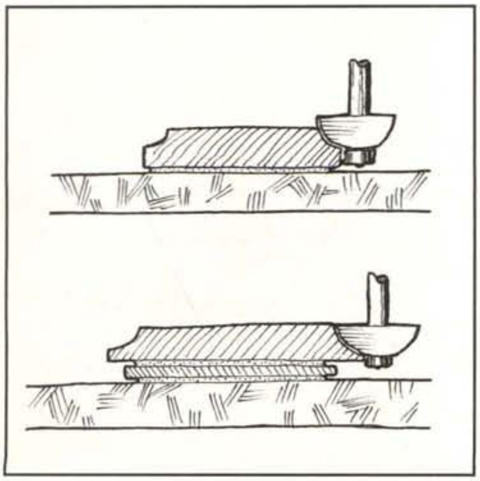
When putting an edge on a wide board, it's often impossible to clamp across the width of the board while the glue sets. You can apply pressure from one side with wedges inside C–clamps, using as many as you need to suit the length of the edge.

Shown here is a single wedge applying pressure directly on the edge strip. To reduce the risk of movement, you could use a pair of folding wedges under the clamp and driven opposite ways over a packing.

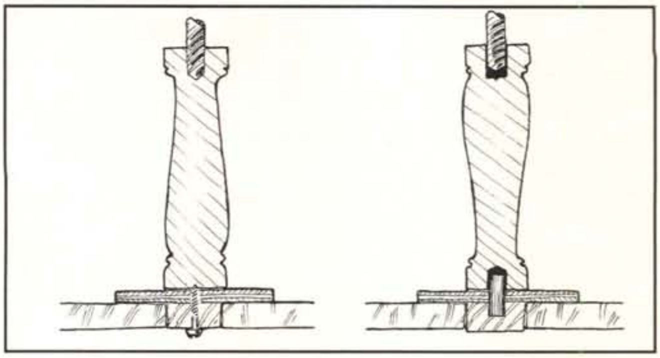
Percy W. Blandford
Stratford–upon–Avon

Carpet Tape and Router Safety

When there isn't enough room for clamps, double–sided carpet tape works well to hold small pieces of wood to a flat, dust free surface. It also comes in handy if the material being cut is too thin to give clearance to the pilot on the routing bit. Cut a thin scrap of wood, slightly smaller than the piece to be routed, and sandwich it between two pieces of carpet tape. Use the tape once and discard it when it collects dust.



Dick Dorn
Oelwein, Iowa



Vertical Alignment Pads

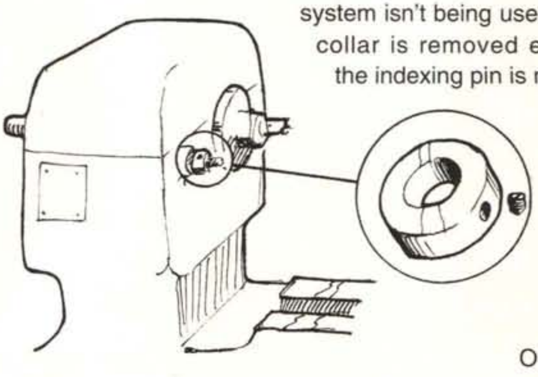
Holes drilled at each end of turned spindles need to be in perfect alignment when the dowels are inserted. I made two simple drilling pads to help me accomplish this task. Each pad is comprised of a 3" diameter round disk made from ¼" plywood and a smaller disk that fits snugly in the center hole of my drill press. The smaller disks, made from ¾" pine, are centered and glued to the underside of the larger disks. Place each pad on a drill press table and drill a ⅛" hole completely through the assembled pads. The drill press table must be centered correctly under the drill bit. Insert a 1¼" wood screw into the bottom of one pad. The protruding tip of the screw will serve as an alignment pin. Place the second pad on your drill press table and drill a hole to accept a short dowel pin which will also serve as an alignment pin.

In use, drill all the holes at one end of each spindle using the pad with the screw tip to keep the bottom of the spindles aligned. The drill bit will automatically align the top of the spindles as they are drilled. Change pads and drill the opposite end of each spindle using the short dowel pin to align the previously drilled holes.

Dick Dorn
Oelwein, Iowa

Secure Lathe Indexing Pin

An indexing pin and indexing plate, or step pulley, could be seriously damaged if they happen to engage accidentally while a lathe is in motion. I secure the indexing pin with an inexpensive shaft collar and set screw when the indexing system isn't being used. The shaft collar is removed easily when the indexing pin is needed.



Dick Dorn
Oelwein, Iowa

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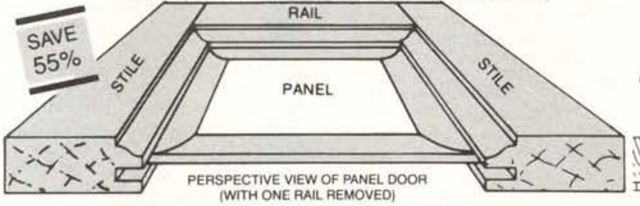
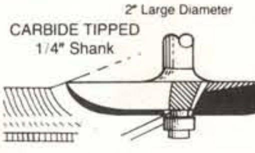


PERSPECTIVE VIEW OF PANEL DOOR (WITH ONE RAIL REMOVED)

RAISED PANEL BIT
SUPPLIED WITH BALL BEARING



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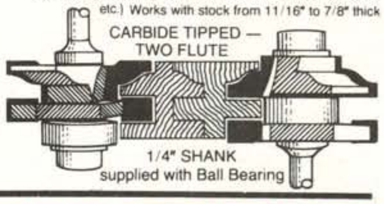

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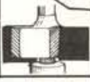
ITEM NO.	BEST CUT BEST PRICE	DESCRIPTION	ANGLE/DEPTH/RADIUS CIRCLE DIAMETER	LARGE DIA.	CUTTING LENGTH	SHANK SIZE	PRICE
#601	Solid Carbide	⅛" **Spiral Cutter**		⅛"	½"	¼" *	$ 9.00
#603		¼" Spiral Cutter		¼"	¾"	¼"	$12.00
#903		¼" Spiral Cutter		¼"	¾"	½" *	$12.00
#904		⅜" Spiral Cutter		⅜"	1"	½" *	$24.00
#905		½" Spiral Cutter	*Proper Adaptor Will Be Supplied	½"	1½"	½"	$29.00
#530		3⁄16" **Edge Beading**	3⁄16" Dia. of Circle		½"	¼"	$15.00
#531		5⁄16" Edge Beading	5⁄16" Dia. of Circle		½"	¼"	$15.50
#350		⅛" **Round Over**	⅛" R	¾"	⅜"	¼"	$11.00
#351		3⁄16" Round Over	3⁄16" R	⅞"	½"	¼"	$11.00
#230		¼" Round Over	¼" R	1"	½"	¼"	$12.00
#353		5⁄16" Round Over	5⁄16" R	1⅛"	½"	¼"	$14.00
#209		⅜" Round Over	⅜" R	1¼"	⅝"	¼"	$15.00
#355		½" Round Over	½" R	1½"	¾"	¼"	$17.00
#655		½" Round Over	½" R	1½"	¾"	½"	$17.00
#656		¾" Round Over	¾" R	2"	⅞"	½"	$21.00
#199		**Multiform Moulding**	Unlimited Patterns	2¼"	2"	½"	$40.00
#205		¼" **Cove**	¼" R	1"	½"	¼"	$12.00
#206		⅜" Cove	⅜" R	1¼"	9⁄16"	¼"	$13.00
#207		½" Cove	½" R	1½"	⅝"	¼"	$14.00
#643		½" Cove	½" R	1½"	⅝"	½"	$15.00
#208		¾" Cove	¾" R	1⅞"	¾"	½"	$26.00
#231		5⁄32" **Roman Ogee**	5⁄32" R	1¼"	15⁄32"	¼"	$16.00
#232		¼" Roman Ogee	¼" R	1½"	¾"	¼"	$17.00
#506		½" **Pattern**	Flush Trim	½"	1"	¼"	$15.00
#508		¾" Pattern	Flush Trim	¾"	1"	¼"	$17.00
#366		⅛" **Slot Cutter**	⅜" Deep	1¼"	⅛"	¼"	$14.00
#368		¼" Slot Cutter	⅜" Deep	1¼"	¼"	¼"	$14.00
#204		⅜" Rabbeting	⅜" Deep	1¼"	½"	¼"	$13.00
#670		⅜" Rabbeting	⅜" Deep	1¼"	½"	½"	$14.00

ITEM NO.	BEST CUT BEST PRICE	DESCRIPTION	ANGLE/DEPTH/RADIUS CIRCLE DIAMETER	LARGE DIA.	CUTTING LENGTH	SHANK SIZE	PRICE
#211		⅜" **Core Box**	round nose	⅜"	⅜"	¼"	$10.00
#212		½" Core Box	round nose	½"	11⁄32"	¼"	$13.00
#418		¾" Core Box	round nose	¾"	⅝"	¼"	$15.00
#213		1" Core Box	round nose	1"	¾"	½"	$17.00
#548		**Lockmitre**		2"	⅞"	¼"	$32.00
#214		¼" **Straight**	plunge cutting	¼"	¾"	¼"	$ 6.50
#216		⅜" Straight	plunge cutting	⅜"	1"	¼"	$ 6.50
#474		½" Straight	plunge cutting	½"	1"	¼"	$ 7.00
#219		¾" Straight	plunge cutting	¾"	1"	¼"	$ 9.50
#779		¾" Straight	plunge cutting	¾"	1½"	½"	$10.00
#462		½" **Bull Nose**	½" Dia. of Circle		¾"	¼"	$16.00
#464		¾" Bull Nose	¾" Dia. of Circle		1"	¼"	$21.00
#764		¾" Bull Nose	¾" Dia. of Circle		1"	½"	$21.00
#545		**Tongue & Groove**	Straight	1⅝"	1"	¼"	$29.00
#845		Tongue & Groove	Straight	1⅝"	1"	½"	$29.00
#546		Tongue & Groove	Wedge	13⁄16"	1"	¼"	$29.00
#846		Tongue & Groove	Wedge	1⅝"	1"	½"	$29.00
#450		⅛" **Beading**	⅛" R	¾"	⅜"	¼"	$11.00
#233		¼" Beading	¼" R	1"	½"	¼"	$13.00
#454		⅜" Beading	⅜" R	1¼"	⅝"	¼"	$15.50
#455		½" Beading	½" R	1½"	¾"	¼"	$17.00
#500		⅜" **Flush**	**Trimming**	⅜"	½"	¼"	$ 7.00
#501		⅜" Flush	**Trimming**	⅜"	1"	¼"	$ 7.50
#503		½" Flush	Trimming	½"	1"	¼"	$ 8.50
#221		½" Flush	Trimming	½"	13⁄16"	½"	$ 8.00
#558		**Thumbnail**		13⁄16"	⅜"	¼" *	$18.50
#858		Thumbnail		2½"	¾"	½"	$35.00
#579		**Molding Plane**		1⅛"	1¾"	¼"	$31.95
#879		Molding Plane		1⅛"	1¾"	½"	$31.95

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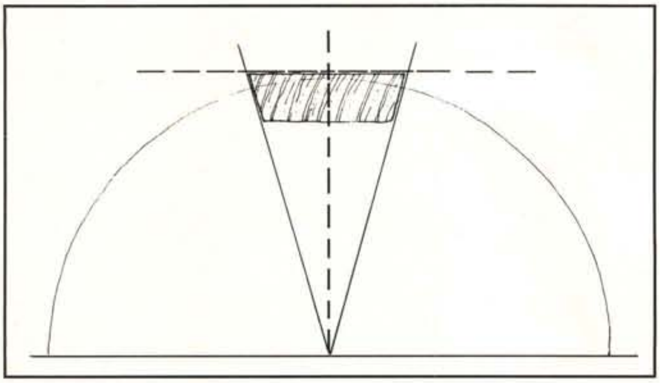
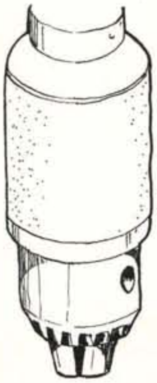


Stave Layout Procedure

You can use paper, cardboard or a piece of wood to layout the dimensions for correctly cutting the angles on staves.

Draw a base line parallel to the edge of your paper. Draw a semi–circle from the center point with the same radius as the barrel you wish to make. Draw a line parallel to the baseline, tangent to the circle and mark 1" to either side of the centerline. Draw lines from these outside points to the centerpoint on the baseline. The resulting angle will give you an even number of staves. With a sliding T–bevel, transfer the angle to the table saw. The key to tight fitting staves is a tuned table saw. Staves are cut by flipping a board end for end as you cut them off. To glue up, lay down two strips of masking tape, sticky side up and place the staves narrow side up on the tape. Apply glue to the joints and roll into a circle and secure with auto hose clamps. It may be difficult to get large clamps but you can connect several together to get the right diameter.

Floyd W. Knapp
Winter Haven, Florida



Chuck Drum Sander

I will often wrap a piece of sandpaper with an adhesive backing around the smooth, vertical portion of my drill press chuck to serve as a quick sanding drum. The sandpaper also serves as a finger grip when bits are chucked or removed.

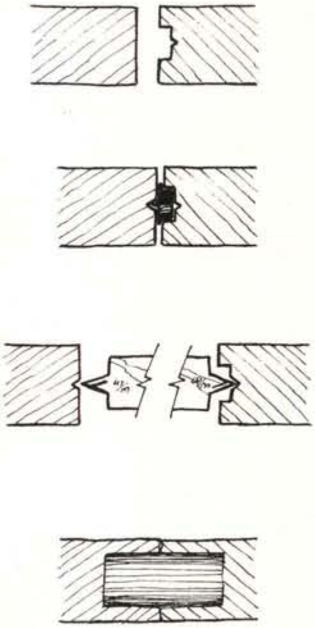
Dick Dorn
Oelwein, Iowa

Recycling Clear Shirt Collar Bands

Save the clear plastic bands that you find in the collars of your new shirts. They make great windows for doll houses, windshields for cars, etc.

David F. Black, JR.
Barnwell, South Carolina

Large Dowel Centers



I've never seen dowel centers larger than ½". Yet there are times when I want to use a larger dowel in the construction of heavy projects. To accurately align large dowels I use a spade bit. Begin by drilling holes for your largest available dowel centers. Insert the dowel centers and transfer the center points as usual. Remove the dowel centers and select a sharp spade bit the size of the dowel pins you wish to use. On the drill press bore holes to the desired depth, the spade bit will align itself with the bottom of the previously drilled hole.

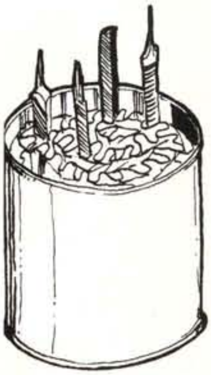
Dick Dorn
Oelwein, Iowa

Tarnishing New Brass

Have you ever seen shiny new brass on an old piece of furniture? It just doesn't look right. What I do is tarnish the new brass to give it an antique look that better suits the furniture it's attached to. Pour a little ammonia in the bottom of a glass casserole dish. Place a brick, or similar object, in the bottom of the dish to elevate the brass above the ammonia. Put the brass you want tarnished on top of the brick and cover the container to keep it air tight. Ammonia gas is harmful so conduct this procedure in a well ventilated room away from animals and children. The process takes only a few minutes and the amount of tarnish on the brass is regulated by the amount of time the brass is left exposed to the gas.

Frank Neimeyer
Horseheads, New York

Small File Holder



I was constantly misplacing my assortment of small files. To help alleviate the problem I cut a length of corrugated cardboard to the width of a small can. I then rolled up the cardboard and inserted it into an empty can. The files are now stored, tang end down, in the corrugated roll which sits handily on my workbench.

Howard E. Moody
Upper Jay, New York

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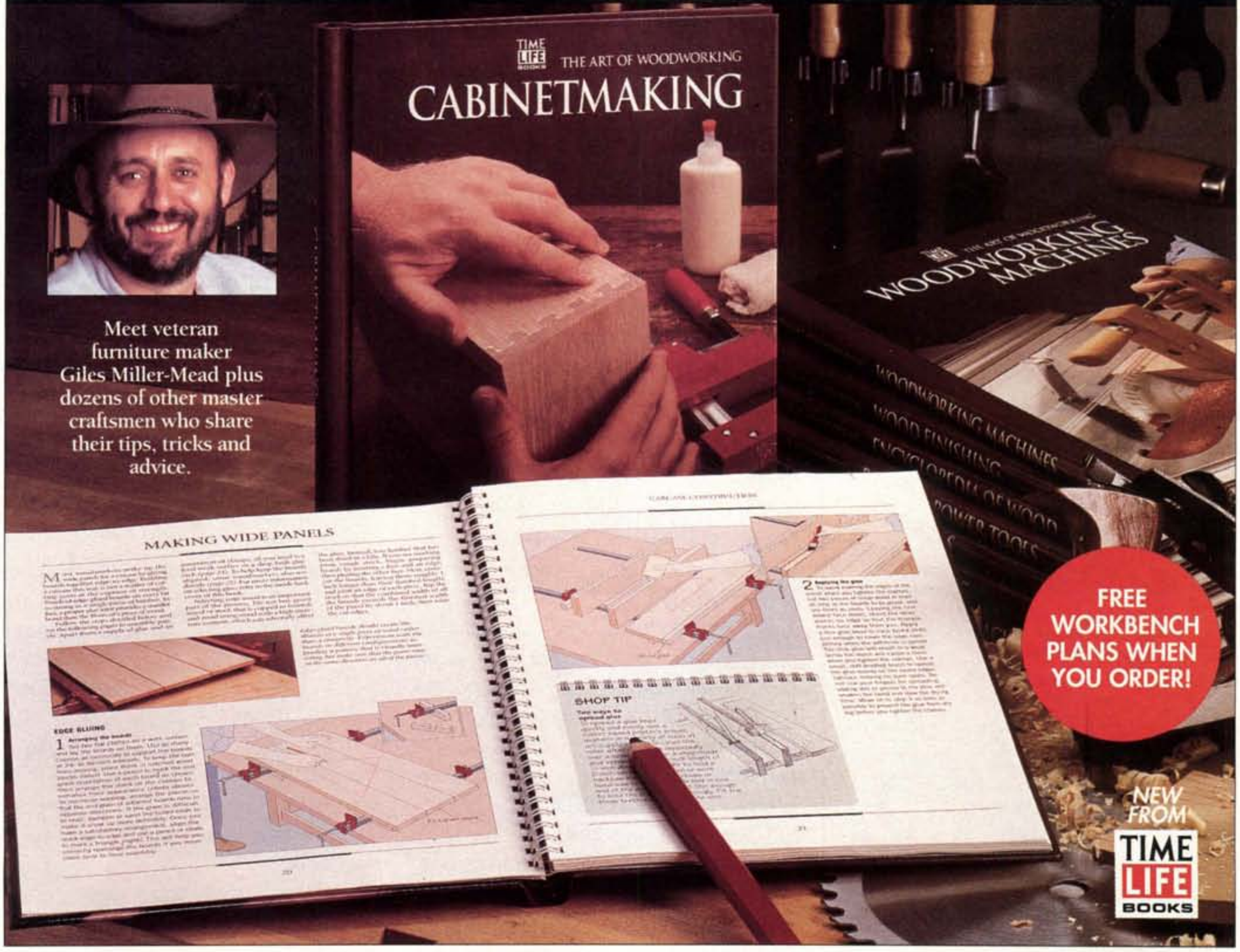

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The Finishing Forum

by Dick Fitch

The Finishing Forum is an ongoing discussion about the art of wood finishing. If you have a question or a problem to solve, we'd like to help. If you have a tip or secret to share, or you recently tried a new product, write to: The Finishing Forum c/o *PW*, 1041 Shary Circle, Concord, CA 94518. Letters may be edited.

Finish Compatibilities

Can I apply urethane or any other varnish to old shellac (after sanding anyway)? Can I apply Danish or tung oil on shellac or urethane or vice versa?

Rafi Ahmad
Scarborough, Ontario

The problem with the term urethane is that it is often viewed as a specific. It is not. The formulation potential for the use of the urethane reaction is broad and varied.

The over–the–counter oil–modified polyurethane varnishes are often fussy about what they are applied over. They do not adhere well to shellac, most lacquers, products containing stearates (sanding sealers, etc.) or even to themselves if they're fully cured.

There is a rule in the fine art field which applies to nearly all coating systems barring special effects—always apply fat over lean; hard first, flexible on top.

To answer your questions directly:

Urethane varnish, as a rule, is not advised over a shellac finish. But I have used shellac wood sealer (1 part 3 lb shellac with 3 parts shellac solvent soaked into the wood, wiped, dried, and lightly sanded) under urethane with good results. Most traditional oleoresinous or alkyd varnishes can be used over old cleaned and sanded shellac, at least for the short run.

Shellac is thermoplastic (softens when hot). Urethane alkyds and oleoresinous varnishes are not. They polymerize and cross–link as they cure which makes them more rigid with age.

Danish oil and tung oil are penetrating finishes. Shellac or urethane finishes on wood inhibit penetration and defeat the purpose of the penetrating oil. You can use shellac or urethane over an oil finish if basecoats are clean, cured and sanded. Traditional oleoresinous varnish is a safer approach. Using an oil finish over shellac or urethane is questionable, but it can be done. Do not use a product based on raw tung oil. When not allowed to penetrate, raw tung oil dries with a fine wrinkle.

Dick Fitch

Hard Finish Trouble

For the past few years I have been spraying with Simpson Sanding Sealer™ and Simpson Lacquer™. After applying two undiluted coats of sanding sealer, I apply one undiluted coat of the lacquer (sanding between coats). The finish is never hard enough.

I would like to obtain a very hard finish on my projects. How can I achieve this? Can you suggest a better product?

Leo Allison
Bend, Oregon

It would be presumptuous to try to evaluate the product you are using. I am not familiar with Simpson—so here are some general observations that may be pertinent.

1. Using undiluted lacquer is not necessarily a plus. Thin coats of lacquer reach optimum results better than heavy ones. The system has to be carefully balanced. High boiling, non–blooming flow control solvents, when trapped in the film of a lacquer system, act as plasticizers and greatly prolong the time necessary to achieve potential hardness.

2. Sanding sealers are meant to be sanded. They sand more easily and with better texture than the wood itself.

3. Lacquers formulated with active solvents that dry too quickly, prevent proper orientation of the long linear polymers resulting in a weaker surface.

4. The hardness you are after may be beyond the potential of simple lacquer formulas. Perhaps catalyzed lacquer enhanced by urea, melamine, or urethane resin is in order.

Dick Fitch

***Dick Fitch** is the resident alchemist at The Bartley Collection, Ltd.*

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Book Reviews

by Hugh Foster

Shelving and Storage: 25 Easy-to-Build Projects for Every Part of Your House by Tim Snyder; Rodale Press Books, 33 East Minor St., Emmaus, PA 18098; 360 pages, hardcover, $26.95.

Even better than the instructions in this useful book are the projects. The designs are simple and effective. Moving from the construction of utility shelves through several other kinds of shelves in the first 50–plus pages, Snyder covers specific projects according to the area of the house where you might find them most useful.

Each design is accompanied by a photo of the finished project as well as detailed illustrations, and numbered step–by–step instructions. Highly recommended!

Woodworking Projects for the Country Home by Lavon B. Smith; Sterling Publishing Co. Inc., 387 Park Avenue South, New York, NY 10016; 160 pages, paperback, $12.95.

Nearly 500 illustrations help to ensure that we complete these attractive projects quickly and accurately. The instructions are clear enough that even novice woodworkers will achieve success and the more advanced woodworker will still love the plans that are country practical rather than the all too common country cute.

Some of the more unusual plans in this collection include a case for collector's baseball cards and plans for Smith's curio cabinet. Nearly 40 more plans complete this useful volume.

52 Country Projects for the Weekend Woodworker by John A. Nelson; Sterling Publishing Co., Inc., 387 Park Avenue South, New York, NY 10016-8810; 160 pages, paperback, $12.95.

If you want your novice woodworking skills to improve, this may be just the book for you. These gift and decorative projects can all be made with basic tools and methods and a minimum of space. Through Nelson's careful instructions, you will complete each project a better woodworker than when you began. The models for each project are all priceless country heirlooms. There's a lot to like in this very handsome presentation.

Japanese Joinery: A Handbook for Joiners and Carpenters by Yasuo Nakahara; Hartley & Marks, 79 Tyee Drive, Point Roberts, WA 98281; 239 pages, paperback, $14.95.

Len Brackett, one of the few Americans to rise through the ranks of temple carpenters, recommends this book as an interesting excursion or the start of a lifetime study. Discussed in the book are: end joints, right angle joints, types of fasteners, framing and construction techniques for builders. The book is likely to be an excellent supplement to other references on the subject as it deals with joinery on a large scale. A nice addition to your library.

Creative Designs in Furniture by the Editors of Krause–Sikes, Inc.; Krause–Sikes, Inc., 228 State Street, Madison, WI 53703; 160 pages, paperback, $19.95.

Creative Designs in Furniture is much like the Krause–Sikes Design Book series, yet its differences make it notable. Like the Design Book series, this volume is full of sumptuous photos of magnificent hand–crafted furniture. Printed on heavy paper, it's a veritable feast for the eyes and the mind. Unlike the Taunton books, this one is intended as a catalogue. Each of the creative builders who appear here have their name, address, and phone number prominently included.

***Hugh Foster** is an English–teaching woodworker and author from Manitowic, Wisconsin.*

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Here's How to Turn Your Woodworking Skills into Cash!

"My woodshop makes me $300 a week, part time. Your's can, too!"

by Rick Gundaker

You've heard of "the woodworker who was a real butcher." It's true, for many years I *was* a meat cutter in a butcher shop in Erie, Pennsylvania. But several years ago the poor economy in the Erie area forced me to look for a new job.

After four months, I found a new job, but it paid less and had fewer benefits. I desperately needed a second income.

I was sitting at the kitchen table very late one snowy night in December. I couldn't sleep, my checkbook was overdrawn, bills were piling up and the bank was threatening to foreclose on our home. Then it came to me.

For many years I had been making woodcrafts. I had made many unique items for our home. Everybody raved about them, so I started making them for gifts. My wife, Amy, said, "Rick, you should start selling your woodcrafts." But I just laughed. Well, I wasn't laughing that night. Maybe Amy was right. Maybe I could sell them!

I took what little money we had, borrowed some from my Mom, and turned to my hobby with serious determination.

When I first started, my income was small. But time and experience helped me develop a successful selling method. Plus, I designed many easy-to-make, fast-selling woodcrafts. My income grew beyond my greatest dreams.

Today, Amy and I live in a nice country home on ten acres of land and it's paid for! That's a great feeling, but the best feeling of all is the self satisfaction I have of being able to make the extra money I need whenever I need it.

You, too can make the extra money you need while enjoying your hobby. Using your basic woodworking and painting skills, you can create great gifts and turn your woodshop into a part-time money maker. I know it can be done because I did it, and I've helped many other woodworkers make money part time, too!

The following are excerpts from letters I've received from woodcrafters I've helped.

"You sure know what sells! The items I made from your plans have been on display at the local bank in St. Joseph. In less than 30 days I have sold ***$1,700*** *of my woodcrafts!! I'm enclosing a news story our local paper did on my work."*

W.F.H. of St. Joseph, MN

"My wife is a school teacher. I made her one of your cute designs to set on her desk. Other teachers saw it and and she sold eleven of them before the day was over. Keep up the good work."

C.M. of Baltimore, MD

"You're doing good. I've made several of your plans and the response to buy has been great. Every year I sell my crafts at our church fair and donate all the proceeds to the church. In 3 days I made over $600!"

C.R. of Chalmelle, LA

"Your patterns are simple and very easy to follow. I'm fairly new to woodworking and it's great to see full-size patterns with enough information so that even a beginner with limited woodworking knowledge can complete a project on their own. I'm really having fun with woodworking. Thanks for sharing your knowledge and experience, it's invaluable to the novice."

C.L. of Houston, TX

If these woodworkers can do it, you can, too!

This isn't some kind of "Get Rich Quick" deal. No way. There's *plenty* of room for *everyone* in crafting. I won't be competing with you and you won't be competing with me. That's why Amy and I would enjoy showing you how you can start your own craft business using your basic woodworking and painting skills. You can go as far as you want... *profits are virtually unlimited!*

HERE IS WHAT I'LL SEND YOU

I've put all my successful methods, plus 35 of my fastest selling designs, with step-by-step instructions into one fact-filled guide.

I'll show you...

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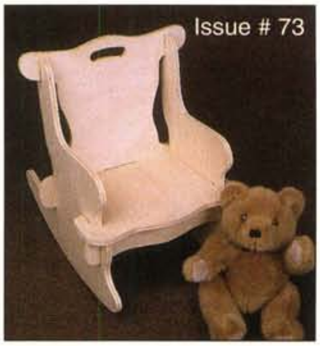

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Money Make$ The World Go Round

Starting your own business can require substantial capital and financial planning

It takes money to make money and one of the major causes of early failure of small businesses is insufficient working capital. The amount of money you have or can raise will have a considerable bearing on whether you succeed or fail when you attempt to change your hobby into a business or to expand a business you've already started. To begin, it's important to determine how much money you will need and where and how to get it.

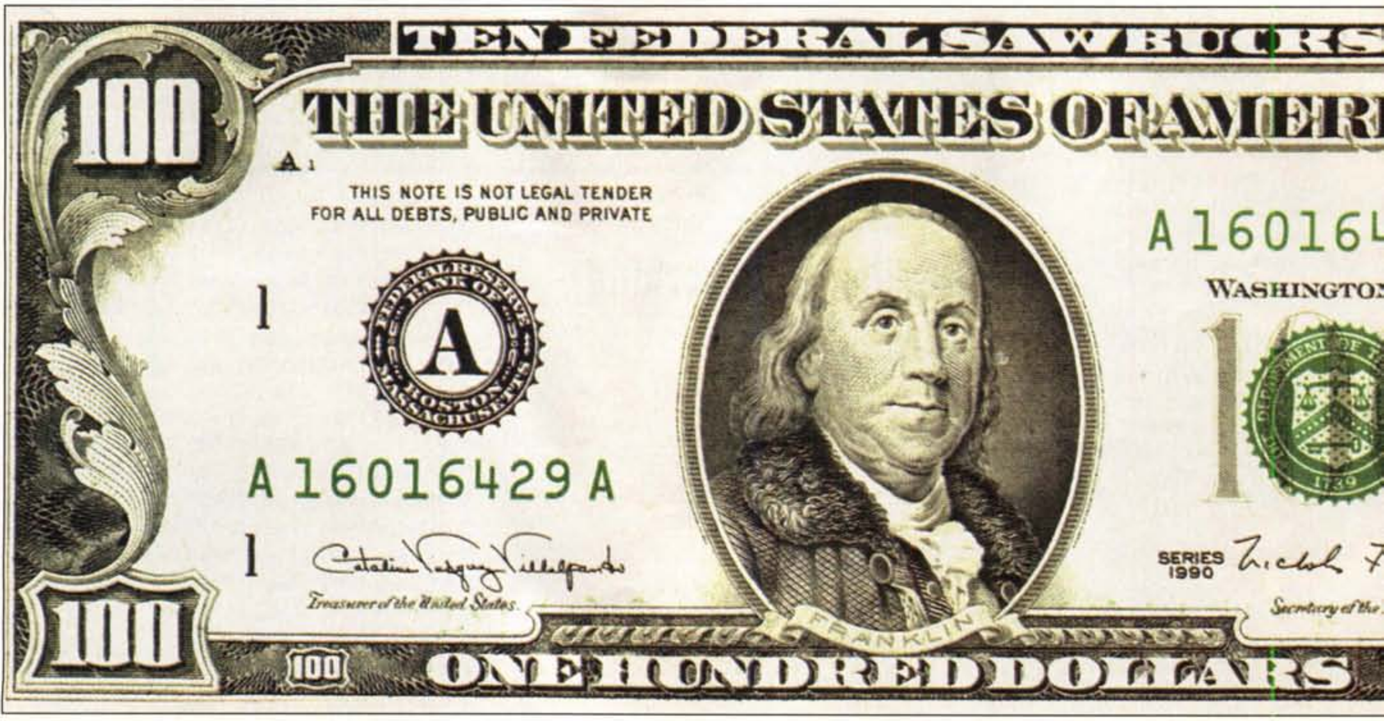
How much is enough?

The amount of money required to start a business is directly dependent on the individual's specific circumstances and the type of business venture you're undertaking. If you're buying an established business, check whether it generates a sufficient income to provide you with an acceptable salary. If it does not, then, in addition to the sale price of the business, you will need enough money to live on while you build the business to the point where it can support you. The same applies if you begin a business from scratch. A good rule of thumb is to have enough money to live on for one year to eighteen months without taking anything from the business. As your business grows, you will soon be able to draw a salary from it.

With a manufacturing business, you first must buy the machinery and equipment to build your product and the raw material from which to build it. When you sell your product, you must expect, as a standard practice, that your customers will take thirty days or more to pay you. So, you will need enough working capital to continue producing until the first payments come in.

If your business requires employees other than yourself, you will need enough money to pay salaries and employee taxes and benefits. Then of course, there are the incidental overhead expenses of building rent, utilities, and other basic operating expenses. It all adds up.

Develop a business plan $ To successfully raise money you have to be a salesman. Getting money to start a new business or to buy or expand an established one is one of the hardest sales jobs you will ever encounter. When you approach a prospective lender/investor, you must exude complete confidence in your idea and in your ability to make it succeed. You must be fully prepared to discuss all aspects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by Ken Sadler

of your idea as well as explain how and why it will work, the projected rate of return on the investment and the anticipated time frame for that return. The best way to prepare your presentation is to develop a business plan and an income projection for at least the first two years.

Your plan should outline how you expect to run your business, what your marketing and sales policies will be, and how you expect to create a profitable business. Not only will the business plan serve as information for your potential investors but it will also force you to take an organized look at your plans and will give you a framework within which to efficiently run your business. It will help you define what your product or service is, and most importantly, who your customers are and how you will reach them.

> To successfully raise money you have to be a salesman. Getting money to start a new business or to buy or expand an established one is one of the hardest sales jobs you will ever encounter.

To be more specific, the plan should answer these questions:

How big is the market for your product?
Where is that market located?
Who will your customers be exactly?
How will you reach them and persuade them to buy?
Is this a high volume–low margin or low volume–high margin product?
What and where is your competition?
How much money do you need?
How will you use the money?
How long will you need the money?
How and when will you be able to pay it back?

What is a projection?

Simply stated, a projection is an estimated profit and loss statement that indicates what you think your income, expenses, and profit for the next two or three years will be. It expresses in figures what the plan says in words. A word of warning concerning the expenses: Be sure to include among them a salary for yourself. Many small businessmen make the mistake of not including a salary for themselves in the cost of producing the item. Consequently, the owner's salary must come out of the profits, if any. That, in turn, leaves nothing for the business to grow on. An old adage I found true some thirty years ago is, "Salaries are to live on, profits are to grow on." You must have both for a successful business.

Getting the funding you need

Having completed your plan and projection, you're ready to begin your quest for the money you need. So, where do you start? Not at a bank, that's the last place to look. (You'll see why later on.) If you're thinking about a very small business, the amount you will need isn't apt to exceed $50,000. There are many places to look and I'll try to give you a rundown on a number of the most likely.

Your own money ▪ At least part of the money has to be yours. If you don't have faith in your idea no one else will. If it's all your own then you can do things your way. You can run the business without interference from lenders, partners or stockholders. If you don't have enough to give yourself the salary that you are accustomed to, then you may have to cut back on your standard of living for a while but hopefully the sacrifices will be worth it.

The best of all worlds is to be able to start or take over a business free of debt. The interest on debt comes right off the top. If times are good interest payments are acceptable, but if times turn sour, they can become burdensome.

Bartering instead of cash ▪ Bartering is the oldest means of doing business there is. It is a fine way for a small company with limited working capital to get things it needs without spending cash. The product you produce may be valuable barter for other items you need to run your business.

Your family's money ▪ Parents are often a good source of money for starting a business, assuming that they have some extra to loan or invest. Many creative financing deals have been forged from family money. Often, the arrangement works out to the advantage of all concerned—

Quick or "Acid Test" = Current Assets - Inventory / Current Liabilities
Liquidit
Inventory to Net Working Capital = Curre

the parents earn an income from the interest on the loan and the children get a loan at a price they can afford. Most parents who can afford to do so will say they would rather invest their money in their children since they know and have confidence in them, and are able to keep an eye on how the money is handled. Another way to tap into family money is to bring them into a corporation or limited partnership which is a topic we will cover soon.

Supplier's credit If your business is one that requires the purchase of considerable amounts of material to build your product and if you can get 60 to 90 day payment terms, a supplier's credit will take the place of the working capital you would otherwise have to have.

Prepayment for goods This approach works best with a mail–order business where the product can be advertised for sale. Production of the item is based upon the number of orders and payments received. The criteria for a successful operation of this nature is the ability to quickly and efficiently fill the order. In today's mail–order market, a time lag of four to five weeks from order date to shipping date is standard.

If you're building furniture or cabinets, it is standard practice to receive 50% of the total cost before the project begins and the remainder upon delivery. Once you build a backlog of orders, the money up front will be a source of considerable working capital. The same holds true with a small retail outlet where you can sell other products along with your own: taking those products on consignment and paying for them after they've been sold.

Borrowing money from banks Applying for a bank loan is the traditional way to get money to start or buy a business, but in today's market, it may just be the last place you'll want to look. Every financial institution has different requirements and a long time customer in good standing may have a better chance at getting a loan than an unknown applicant.

Buying a business

Up to now I have talked about getting money to start a business or to help you get over the hump in one that you already own. In another case, you may want to buy an already established business where it may be best to buy on contract—paying 10% to 15% down on the agreed upon price and the balance on a contract over a period of pre–set years. The advantage to this is that it allows you to get into the business with a relatively small amount of money and pay the balance out of the earnings of the business. Why use this method if you have the money to buy it outright? Because it will leave you with more working capital, fluid money that you may need to get the business turned around. You must however, weigh the burden of the debt against the value of the added working capital. On the other hand, if your money is limited, this may be the only way to swing the deal without bringing in other investors.

Corporations or partnerships There are two other ways of getting the funds you need to have a business of your own, the corporation and the limited partnership. This is investment money rather than borrowed money. Because of this you don't have a debt burden at a time when

Profitability Ratios

$$\text{Gross Profit Margin} = \frac{\text{Sales} - \text{Cost of Sales}}{\text{Sales}}$$

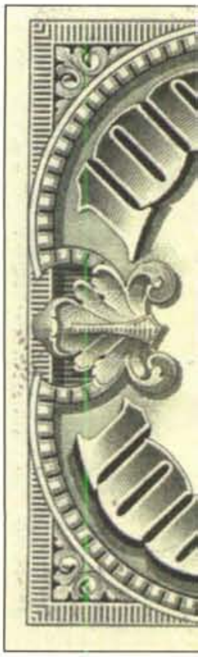
$$\text{Return on Equity} = \frac{\text{Net Income after Taxes}}{\text{Equity}}$$

$$\text{Earnings Per Share} = \frac{\text{Net Income after Taxes}}{\text{Number of Common Shares Outstanding}}$$

ty Ratios

$$\text{Current} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

Inventory
nt Assets - Current Liabilities



margins are slim and the burden of paying interest could keep you from succeeding.

A limited partnership consists of a managing partner, or partners, and the limited partners. The managing partner puts up money and his talent as a manager, taking full responsibility for the operation of the company. He is also fully responsible for any liabilities the company may incur, whatever the cost. The limited partners invest only their money and have no say in the management of the business. In exchange for this, their liability is limited to whatever amount they invested in the partnership. This setup is an attractive way to raise the necessary capital without sharing or losing control of the company or incurring any startup debt. The disadvantage is that you must *share the profits*.

> Applying for a bank loan is the traditional way to get money to start or buy a business, but in today's market, it may just be the last place you'll want to look.

A corporation has an advantage in that you can bring in money from investors without incurring a debt that has to be paid back or on which you must pay interest. The shareholders of a corporation are the investors who put up the money to start and operate the company. If the company fails, everyone loses their money. The corporation is liable for its debt, not the shareholders. The disadvantage is that each share of stock in the corporation has equal value and weight. If you own 51% of the stock, the company is yours to do with as you please. If, however, you own 45% of the shares, the remaining collective shares can control the company.

If you have an exceptional talent or ability in the field in which your company is going to operate, it is often possible to trade that talent and ability for a percentage of the shares while the other shareholders put up the necessary money. This arrangement, however, can be risky in that it is seldom possible to acquire enough shares to control the company and may leave the owner of "sweat equity" out in the cold when the cash shareholders decide to take control.

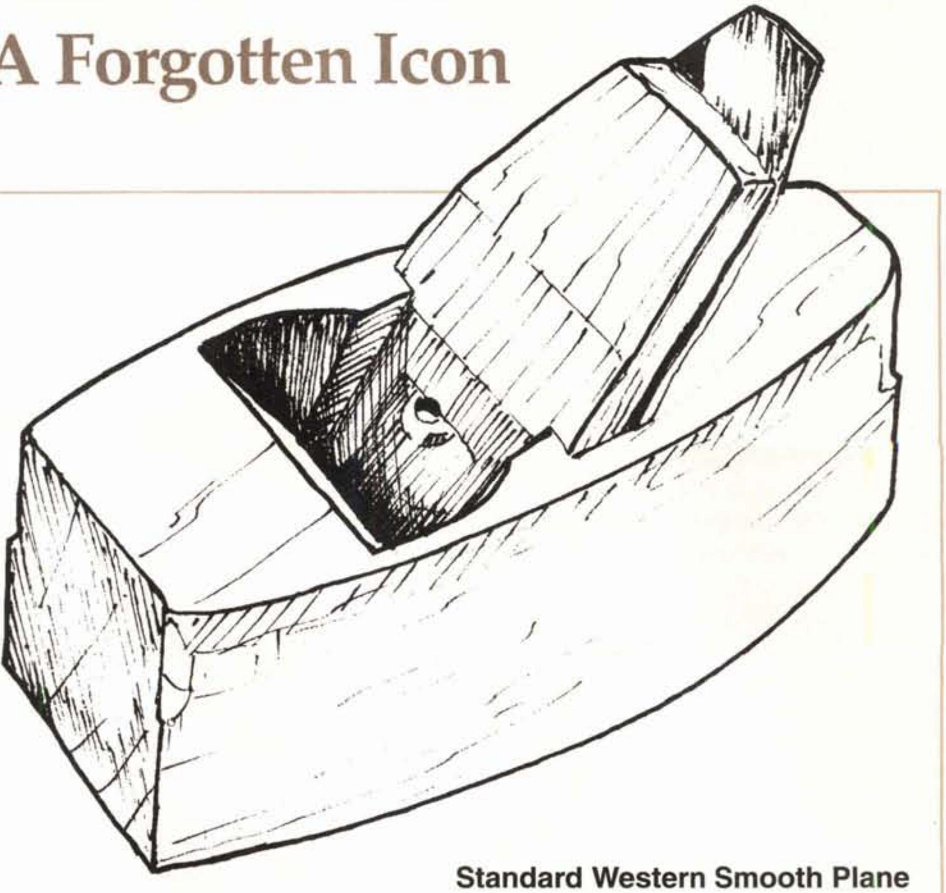
Types of corporations There are two types of corporations, the standard or C type and the S type. The differences are complex and one is not necessarily better than the other. The S type was set up primarily for tax purposes. The only differences between them are their tax advantages. Both require a certain amount of legal work and expense to set them up so it is a good idea to get help from a certified public accountant.

To sum things up, money is the key to working for yourself. If you have enough of your own to swing it, you're in good shape and more fortunate than most. If you will need outside money, the ways I've described are most commonly used. Try one or all if that's what it takes to get the money you need to build your business. PW

The Smooth Plane

Evaluating A Forgotten Icon

Twenty years ago, Raphael Salaman noted in his *Dictionary of Tools* that the smooth plane could still be found in most woodworking shops. He commented that the soles were so worn that their original thickness was considerably reduced. Today, the first statement is probably not true, and the second is liable to make many people wonder: thin planes—what could he have meant? Salaman was talking about wooden smooth planes. Nowadays, if smooth planes exist at all in a woodworking shop, they're likely to be the metal type.



Standard Western Smooth Plane

A Forgotten Icon

Articles appear in woodworking magazines from time to time describing how to make metal smooth planes more efficient. Instructions tell how to improve the adjustments to the moving parts, refine the casting, flatten the sole, etc. The sad truth is that the technique for using these tools is becoming less a part of the woodworker's basic knowledge. A table saw and a belt sander are more frequently found in today's shops than a smooth plane. A wooden smooth plane is more an icon of antique tool collecting than of contemporary woodworking.

Table saws are admittedly useful and can save a lot of labor. For those where the product is more important than the process, the table saw has become the icon of contemporary woodworking. But the sander, in whatever form—belt, oscillating, reciprocating, or stationary—is a less defensible invention. It is true that one of the most fundamental joys of woodworking derives from the impulse to make wood smooth. Using some form of abrasive to this end has been common since Roman times, and probably earlier. It would be hard to deny the practice completely, for there are situations where sanding is either necessary, or where its unique effects are impossible to duplicate by any other means. But, as the preeminent way to smooth wood it leaves a lot to be desired.

A sanded surface, no matter how fine the grit, remains an abraded surface. This is fine for many materials (such as metal) and can result in an impeccable smoothness and shine. However, because of its cellular structure, wood can never be rendered as smooth by abrasion as it can by being cut cleanly with a knife. The effect is more easily seen after using a relatively coarse abrasive. The ends of the fibers are torn, frayed and bent. Individual abrasive particles scratch the surface, and sanding residue fills the pores of the wood. If the process is repeated using ever finer grits, the scratches will become smaller, but the other effects remain the same. A wood surface smoothed by abrasion never has the shine or clarity of a well–planed or scraped surface. The effect of

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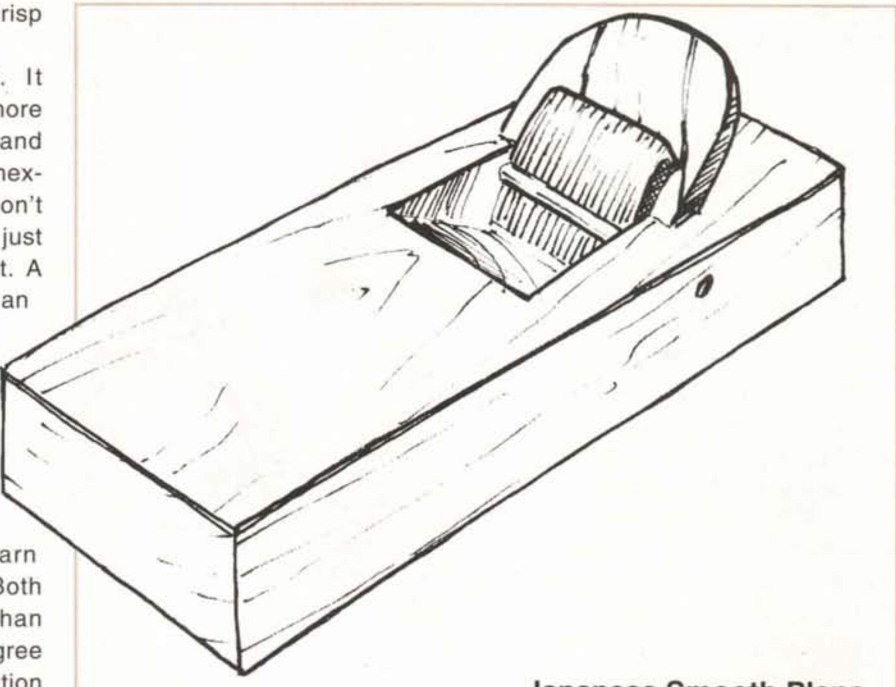
***John Watson** makes furniture and writes about woodworking in Inverness, California.*

being able to see into the wood, the crisp clarity of the grain figure, is lost.

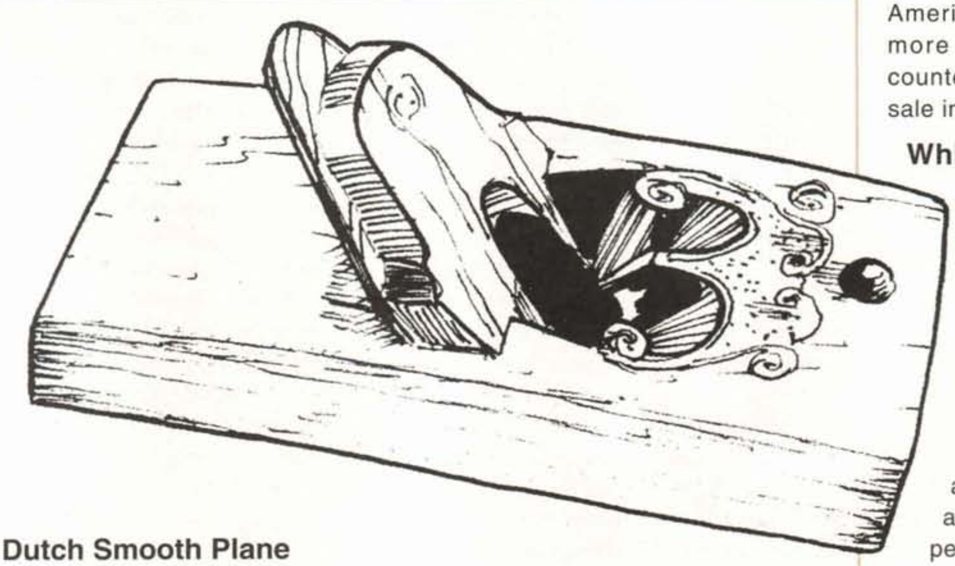
The sander, however, is fast. It achieves its second–rate effects far more easily than a plane. Telltale gouges and rounded edges are common signs of inexperience with the belt–sander. You don't have to learn how to sharpen it—you just need to know how to change the belt. A hand plane by comparison can seem an arcane and inefficient relic of the good old days. Who, in their right mind, would want to return to that world?

If you want the incomparable look and feel of a surface that has been cleanly cut, a surface that is at once smooth, flat, and alive, you must learn how to use a plane and a scraper. Both have edges designed to cut rather than bludgeon or tear the surface. The degree of sharpness depends on the composition of the blade material. Under high magnification even the most keenly sharpened edge looks more saw–like than knife–like. Along with the burnishing action of the plane's sole—especially a wooden plane's sole—this cutting edge is capable of producing a far superior smoothness than any abrasive.


Japanese Smooth Plane

A Far From Rare Tool

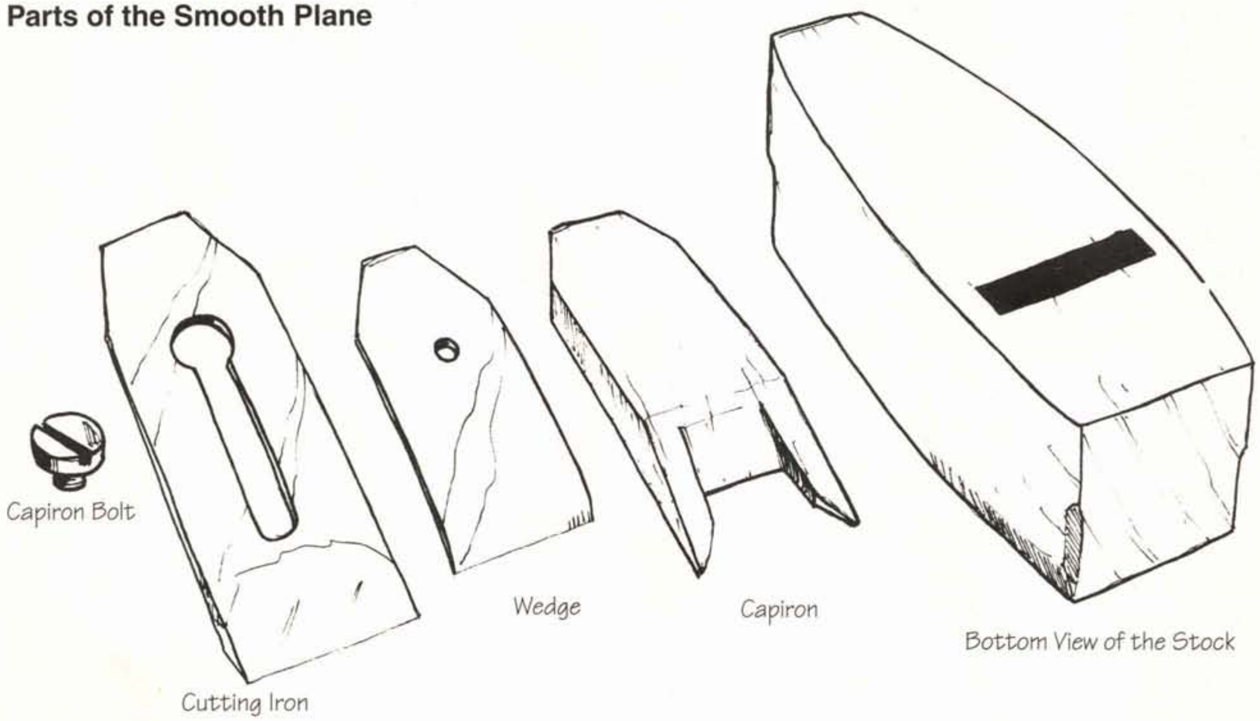
Although it may no longer be as common as Salaman reported, the wooden smooth plane is far from rare. Plenty of planes can still be found at flea markets, antique stores and in inventories of old tool dealers. America and Britain have many woodworking tools in common. In Britain, you can find wooden smooth planes that are virtually identical to their American cousins, along with those from slightly different European heritages. Tools from European countries may look a little strange to the American eye, but they are still instantly recognizable as smooth planes. Further afield is the wooden Japanese plane. It's unique in representing a class of tool—virtually obsolete in America—that's actually becoming more popular. Unlike its western counterpart, it's regularly found for sale in mail–order tool catalogs.


Dutch Smooth Plane

Which One Is Best?

Although its general shape and size are enough to make a smooth plane easily recognizable, there remains a variety of types which can be differentiated once you examine them closely. The variety is such that you may wonder if they're all intended to do the same job, and which is best. They do all perform the same task, but as to which one is best, that comes with

Parts of the Smooth Plane



experience and from personal preference. Almost any wooden smooth plane can be made to perform well once you understand the working principles.

Don't even bother with a tool that's incomplete. A complete tool is comprised of a stock or body, a wedge and a blade comprised of two parts—a cutting iron and a capiron. In American–made blades, the short bolt holding the cutting iron to the capiron is screwed directly into a threaded hole in the capiron. In British–made blades there's often a small brass boss fixed to the top face of the capiron, and the short bolt is threaded through the capiron into the boss. In its simplest form that's all there is—stock, wedge and blade.

Planes dating from earlier than the beginning of the nineteenth century, and cheaper models produced later on, have single blades. Since single blades weren't designed to be used with a capiron, there's no slot (uncut) for the capiron bolt to be inserted through. Old tool dealers sell blades, or packets of blades, manufactured expressly for wooden planes, and identify them as cut or uncut.

Armed with this knowledge you shouldn't be fooled by a plane loosely fitted with a single cut blade—you'll know at once that the capiron is missing. At the same time, you should be aware that a plane designed for use with a single iron has a narrower slot cut in the sides of the throat than a plane designed to accommodate a double iron. If you find a plane with a wedge and a single—but cut—iron that appear to fit well, the original iron may have been used up or lost and has since been replaced. A cut iron functions just as well as an uncut iron, although the reverse is not true, and this substitution is perfectly acceptable.

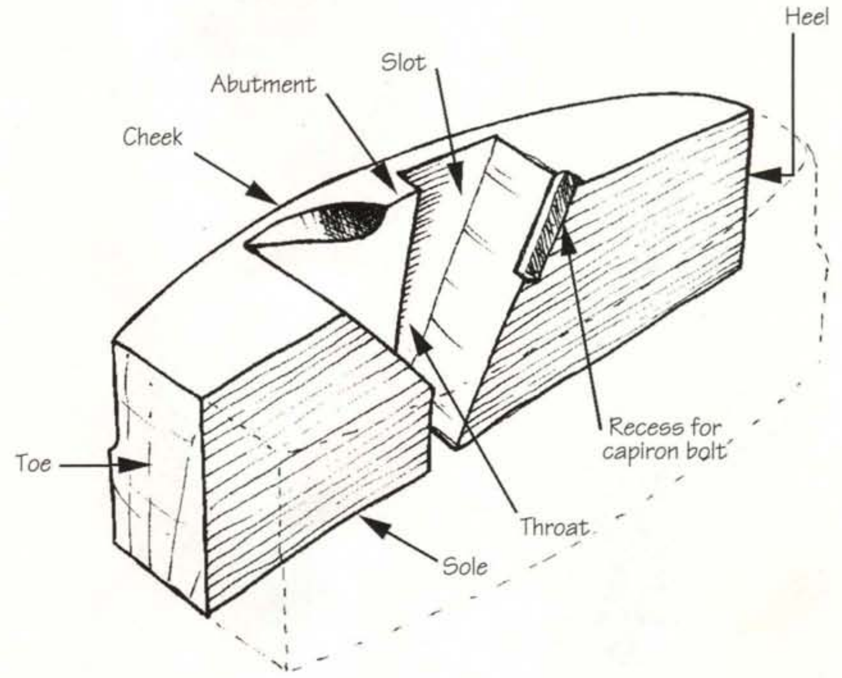
Apart from certain specialized designs a double iron is usually preferred because the capiron adds superior chip–breaking capability to the plane's mouth. This gives the ability to plane without tearout in any direction, with or against the grain. Additionally, a capiron lends support to the extreme cutting edge. Therefore, choose a double–iron smooth plane over a single–iron model.

Having assured yourself that the plane is complete you need to check the throat. This is the hole in the center of the plane where the blade is inserted. A lot of damage can be repaired in a smooth plane to make it good as new—you can replace blades, make new wedges, close the mouth by inlaying extra wood and adding buttons and handles. There are two things however that are almost impossible to repair: broken abutments and cracked cheeks. Either of these conditions is generally cause for immediate rejection of a tool. The abutments and the cheeks both determine the fitness of the stock to hold the wedge and blade accurately and securely. Otherwise, you'll never be able to plane with any nicety or efficiency.

The abutments comprise that portion of the throat immediately in front of the blade. They're formed by the slot where the blade is inserted. If they're broken or partially missing, the wedge's holding ability is compromised.

Cracked cheeks generally result from the wedge having split the sides. This happens because the wedge is a stout piece of wood and the cheeks are the thinnest part of the stock's sides. If the wedge is banged in too hard, the cheeks may crack. The uninformed user may hit the top of the wedge to set it in place, instead of using the correct method of tapping the front end of the stock. If the plane has been left untouched for years and allowed to dry out, the stock may shrink and crack. It is extremely difficult to restore the cheeks to the degree of integrity necessary to hold the wedge and blade assembly during use.

Parts of the Stock



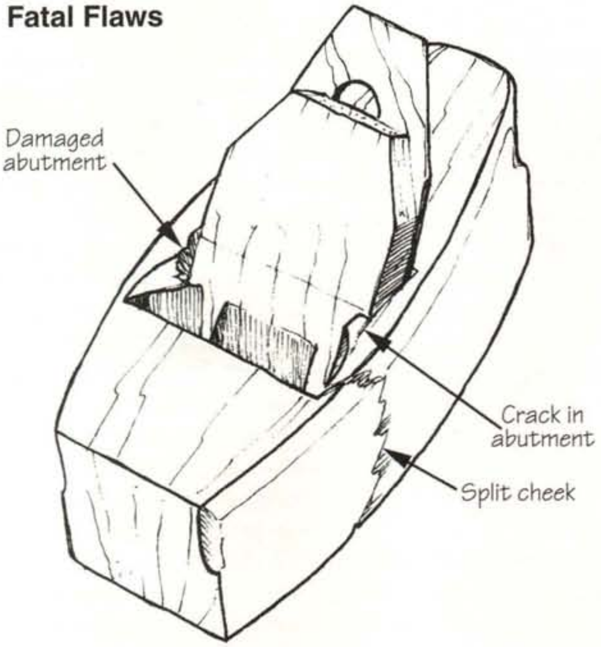
Other cracks and checks may appear more alarming, and occasionally you may find a plane with a crack so big that it is obvious the wedge will not hold. However, in general, small cracks and checks only affect the appearance and not the performance of the plane.

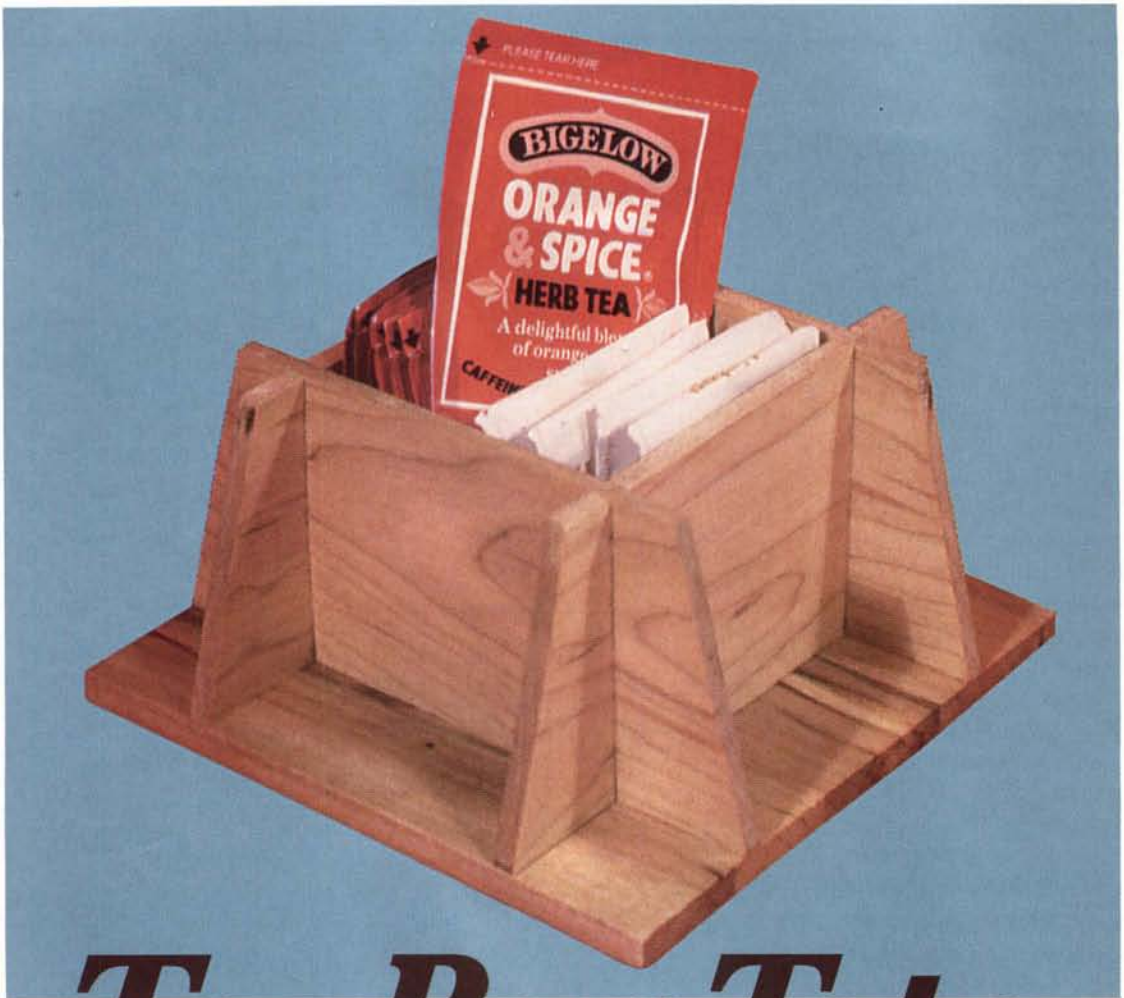
As with any piece of wood, its essential soundness should be considered before taking it home. Worm holes, insect damage, and even rot are not necessarily terminal. A smooth plane is small enough that complete and safe elimination of any insect pest is very easy. Simply place the stock in a sealed plastic bag (to keep out any moisture) and leave it in the freezer for a couple of days.

Small areas of punky wood or incipient rot can be prevented from spreading by normal care—keeping the plane in a reasonably dry and ventilated area. If they do not appear to compromise the throat or consume too large a proportion of the sole, these imperfections can be ignored.

Once the condition of the stock has been stabilized it requires very little care. Apart from shooting the sole from time to time to ensure absolute flatness (the very procedure which results in the reduction of the tool's thickness mentioned by Salaman), normal use generally imparts sufficient oil from the hands to keep the wood in good condition. If in doubt, rub the stock with linseed oil from time to time. An extremely dry stock—one that appears gray and dusty—may even be immersed in linseed oil for a while. This treatment is needed only once if the plane is used normally thereafter. Rubbing candle wax on the sole improves the tool's ability to slide over the work. PW

Fatal Flaws

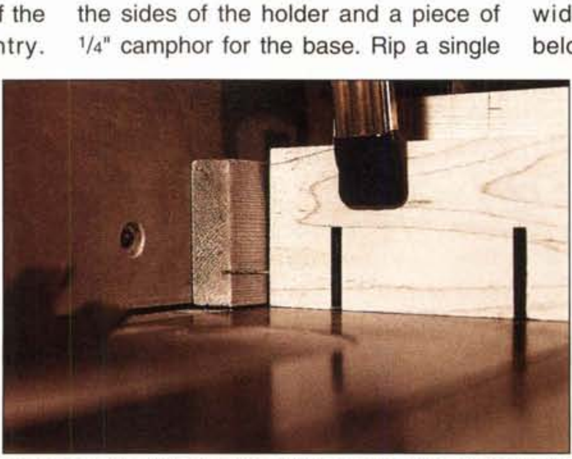




Tea Bag Tote

by Jacob Schulzinger

Herbal teas have become one of the most popular drinks in the country. You'll find the shelves of your local grocery store stocked with an assortment of flavors that will tempt your palate and amaze you with their fine taste. These products have become so popular that you'll often have them offered to you when visiting friends. Many eating establishments offer them on their menus. I got tired of seeing cupboard–worn boxes sitting around the kitchen and decided to build a simple, but attractive, holder to keep a few packets of my favorite teas close at hand.



Clamp an offset block on the table saw to prevent kickback.

I selected 3/16" thick maple stock for the sides of the holder and a piece of 1/4" camphor for the base. Rip a single strip of maple 2 1/2" wide and then cross cut four pieces, 5 1/4" long. Dress up the ends of the pieces. Using your miter gauge on the table saw, cut two 3/16" wide slots 1 1/4" deep as described below to create the locking joints that hold the pieces together. To insure your setup is correct, use some scrap material to test it before you attempt the operation on your stock. Set a stop on the fence so that the distance from it to the inner edge of the slot is 1 1/4" (1 1/16" + 3/16"). All the slots are equally spaced from the ends so this setting is used for all the cuts. Use caution in this operation—the blade is exposed. Because the width of the slot is wider than the saw blade, it's necessary to make two cuts. There's no difference between the top and bottom slotted parts at this time—this feature is created after you cut the slots. Make the first cut on each

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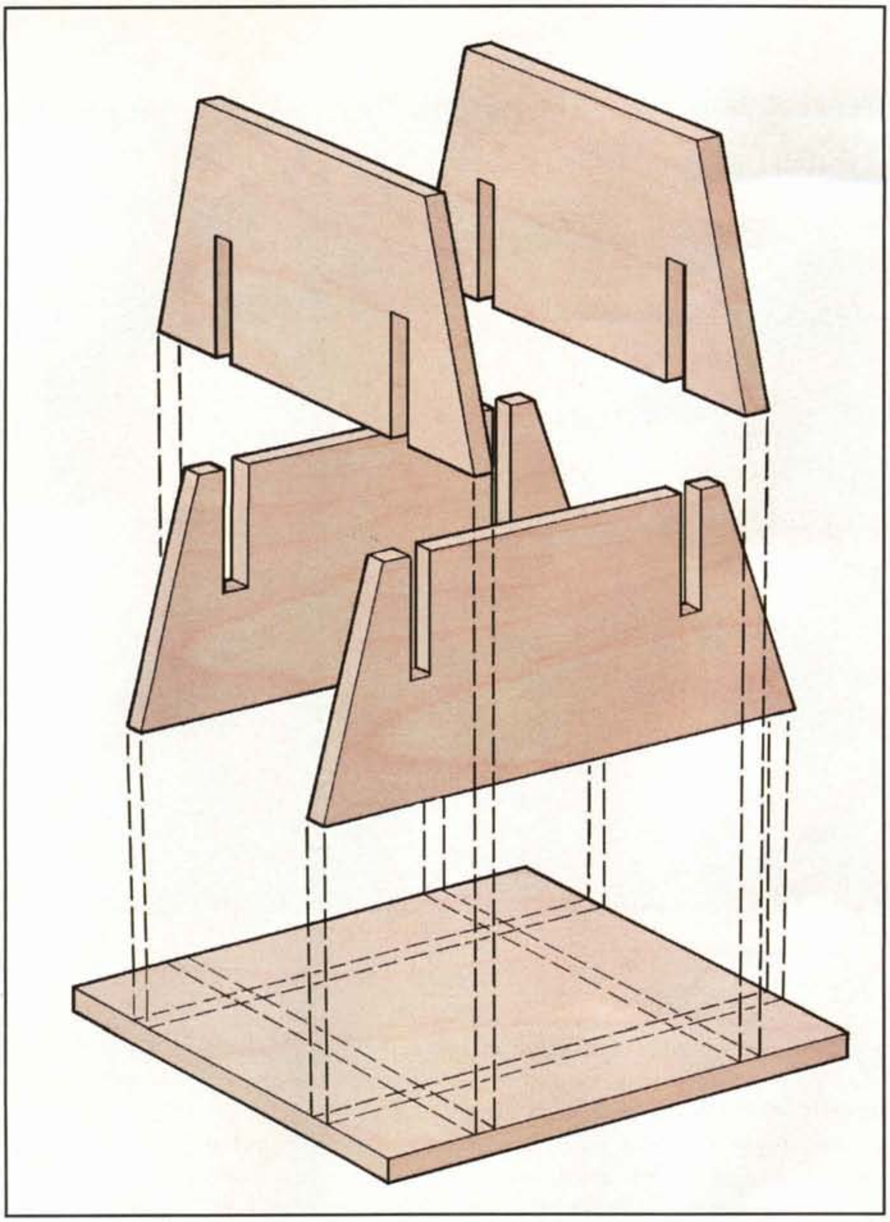
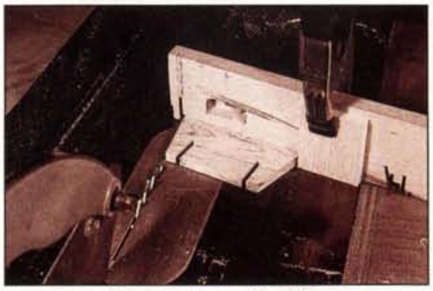
***Jacob Shulzinger,** a frequent contributor to* PW*, lives and works with wood in Houston, Texas.*



end of all four pieces; then move the pieces away from the end stop with a spacer, as shown in the photo to the left, to create the set–over needed. I use a $\frac{1}{8}$" kerf blade and $\frac{3}{16}$" thick material so the spacer needed is $\frac{1}{16}$". You might want to use a set of automotive feeler guages or a few pieces of paper to get the proper spacing. Once you have the spacing set, make the second set of cuts on all four pieces.

Designate two pieces to have the slots on the top. Mark the pieces so they don't get mixed up, then set your miter gauge to 15° to cut the tapers on the ends of the parts. Set an end stop on the miter gauge extension and then cut the ends of the four pieces as shown in the photo to the right. Dress up the pieces with fine sandpaper to remove any fuzz and you're ready for assembly.

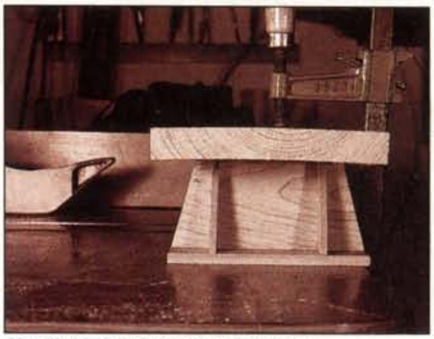
Assembly is a straightforward operation but requires a bit of care to avoid splitting the pieces when you push them together. The potential for splitting is greatly reduced if you use the test pieces you made when you set up the saw. Place a thin line of glue in one of each mating pair of slots and slide the pieces together. If everything was cut properly, all you'll need is a slight tap with a wooden mallet to get the pieces together. Even the best fit can sometimes make for a tough assembly—the glue in the slots causes the wood to swell a bit and can make a snug assembly even tighter. Make the four pieces flush across the bottom edge—this surface is glued to the base.



Keep your fingers clear of the blade.

Sand the base on a flat surface.

Make the base from a series of narrow pieces edge glued together to form a 5$\frac{1}{4}$" square. You could just as easily use a single piece of wood, but the camphor I used was salvaged from a tree trimmer's truck a few years ago. The narrow boards had some pretty color in them and I thought this might be a good project for them. Cut the base plate into a perfect square; then finish sand it in preparation for the final glue–up.

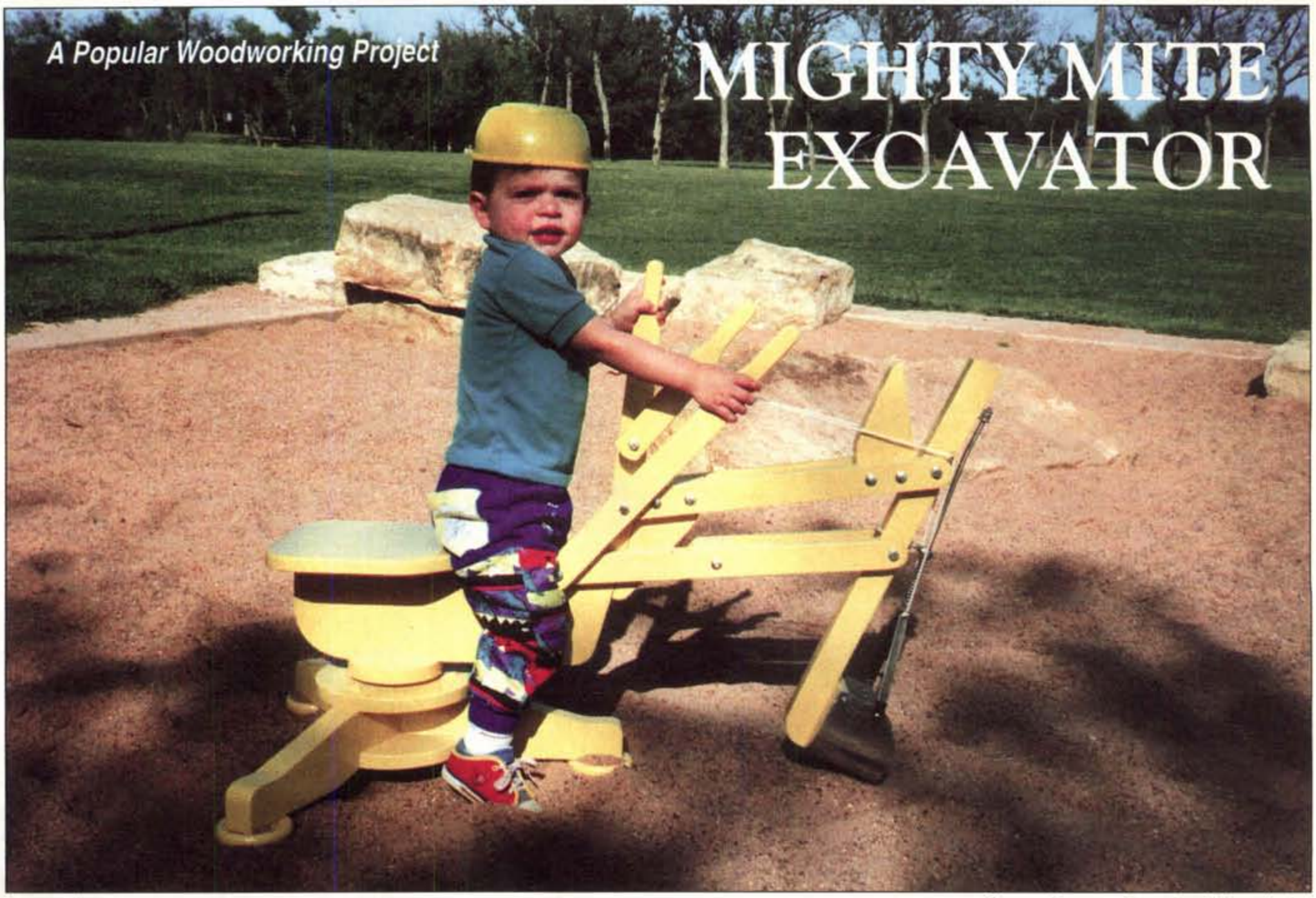


Use light pressure on the clamp.

Sand the bottom edge of the upright assembly flat to mate with the base plate as shown in the photo at the top of the page. When you're satisfied with the fit, glue the upright onto the base with wood glue. Clamp the assembly on a flat surface as shown above. Once the glue has fully dried, treat the unit with your favorite finish. Place felt pads on the corners of the bottom to protect the kitchen table; then fill the tote with a variety of tea flavors and await the compliments.

A Popular Woodworking Project

MIGHTY MITE EXCAVATOR



Chance Benson...Excavator Extraordinaire

by Howard French

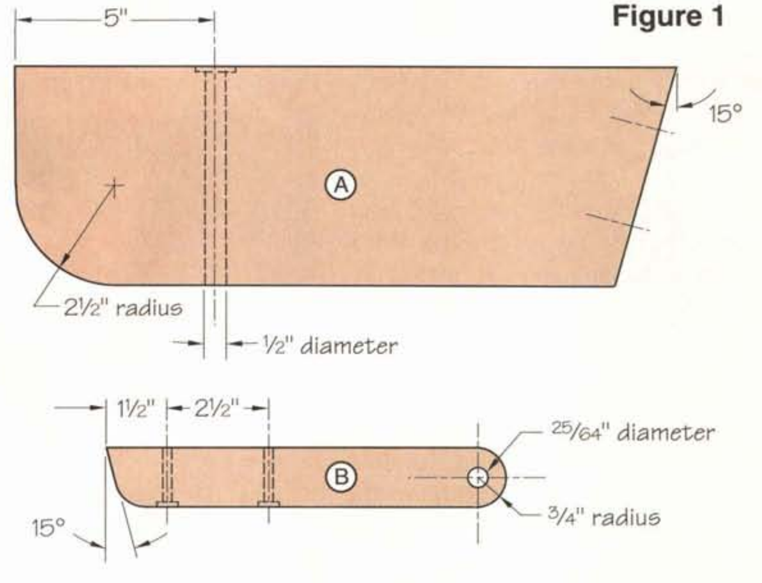
This scaled–down piece of heavy equipment is a challenge to build and a source of continuing entertainment for little hard hats who quickly learn how to operate it. It serves admirably in the sand pile, filling contractor's dump trucks, railroad hopper cars or just moving the sand from here to there and back again.

When fitted with three swivel casters it works great indoors picking up scattered toys and putting them back in their proper containers. The galvanized sheet metal bucket is spring–loaded in the closed position to retain its contents until the operator releases it using the middle lever.

Mighty Mite features 360° swivel capability with quick and easy boom and bucket operation. Once the digging or loading stroke is accomplished, both right and left hand levers work in parallel to lift the load into unloading position. One kid–power has proved to be entirely adequate as a motivating force.

Before attempting to construct Mighty Mite, read over these instructions in their entirety. Study the drawings, photographs and the information contained in the Cutting and Supplies Lists. Many of the components are made from seasoned oak obtained for free from discarded pallets and heavy appliance crate bases. Where appropri-

Figure 1



Howard French *is the author of* Gifts From Grandpa's Workshop *(Tab Books, Blue Ridge Summit, PA) and a frequent contributor to* Popular Woodworking.

ate I've indicated the best grain direction to add strength to the excavator.

No special tools are required for the wood parts and the only two sheet metal parts are of .062" galvanized stock, readily available at your local tin bender. Most hardware stores have various sizes of small rod stock and an assortment of springs.

Central Sub–Assembly

The central sub–assembly is composed of the body (A), the boom support (B), and the body support (C). Cut the body from a 16½" length of standard 2 X 6 stock as dimensioned in the Cutting List. Cut the boom support from sound 2 X 2 hardwood. Make the 5" diameter body support from ¾" hardwood, then drill a ½" diameter hole through its center. Drill a ½" diameter hole through the body as located in Figure 1 for the vertical axle. Drill and counterbore the upper end of this hole sufficiently to recess a flat washer and the peened end of a ½" rod.

When drilling for lag screws, make a pilot hole slightly under the diameter of the screw for the threads to catch. If the screw has an unthreaded shank, it will be necessary to relieve the upper portion of the hole. Drill the boom support for two ¼" lag screws as located in Figure 1. Counterbore the lag screw holes enough to recess their heads and a flat washer.

Drill the bearing hole in the boom support to approximately 25/64" diameter. Some experimentation should be done to produce a press fit. This will depend on the hardness of the wood and the actual outside diameter (od) of the 1/8" pipe nipples cut. Cut five nipples to the correct length and chamfer both ends of each bearing slightly. Do this by chucking the bearings into your drill press, then use a mill file to relieve the edges. Drill out the inside diameter (id) of these bearings to a full ¼". 1/8" pipe is a few thousandths under ¼" id already.

Align the boom support with the 15° front of the body and continue the lag screw pilot holes into the body. Using waterproof glue and the lag screws, attach the boom support to the body. Align the body support (C) with the ½" hole through the body—keep the grains at right angles for strength. Apply waterproof glue to the mating surfaces and permanently secure the two with galvanized finish nails.

Figure 2

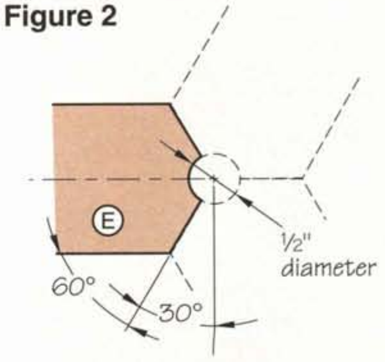
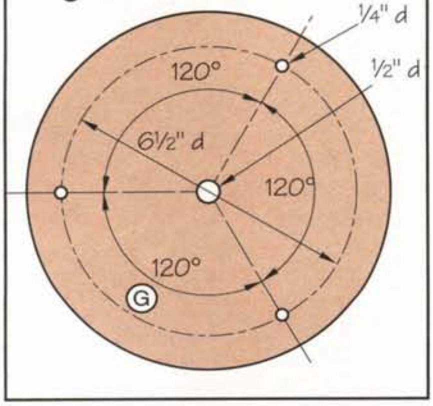


Figure 3



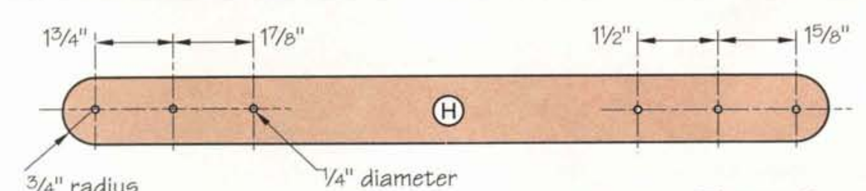


Figure 4

Install the vertical axle and its washer. Mask off the lower end of the ½" axle rod prior to applying the desired finish to the wood components. Cut the seat (D) to the shape shown in the PullOut™ Plans and fasten it to the top of the body with glue and FH wood screws. Press a 7/16" diameter piece of masking tape over the bottom end of the main bearing. This sub–assembly is now completed.

Base Sub–Assembly

The base sub–assembly is composed of three legs (E), three foot pads (F) and the two base reinforcements (G). Cut the base reinforcements and foot pads to size, then drill a ½" diameter hole through the center of one of the base reinforcements. Cut the legs from ordinary 2 X 4 stock to the shape shown in the PullOut™ Plans, then miter their ends to 120° points as shown in Figure 2.

Glue the legs to the two base reinforcement discs—place the disc with the center hole on the bottom, with the grain of the two discs at right angles to each other. Drill and counterbore for the three ¼" diam. X 5" hex bolts, washers and nuts as shown in Figure 3, then attach the leg–to–discs retaining bolts. Turn the base sub–assembly over and line–drill the ½" diameter hole for the vertical axle. Glue and nail the footpads in place.

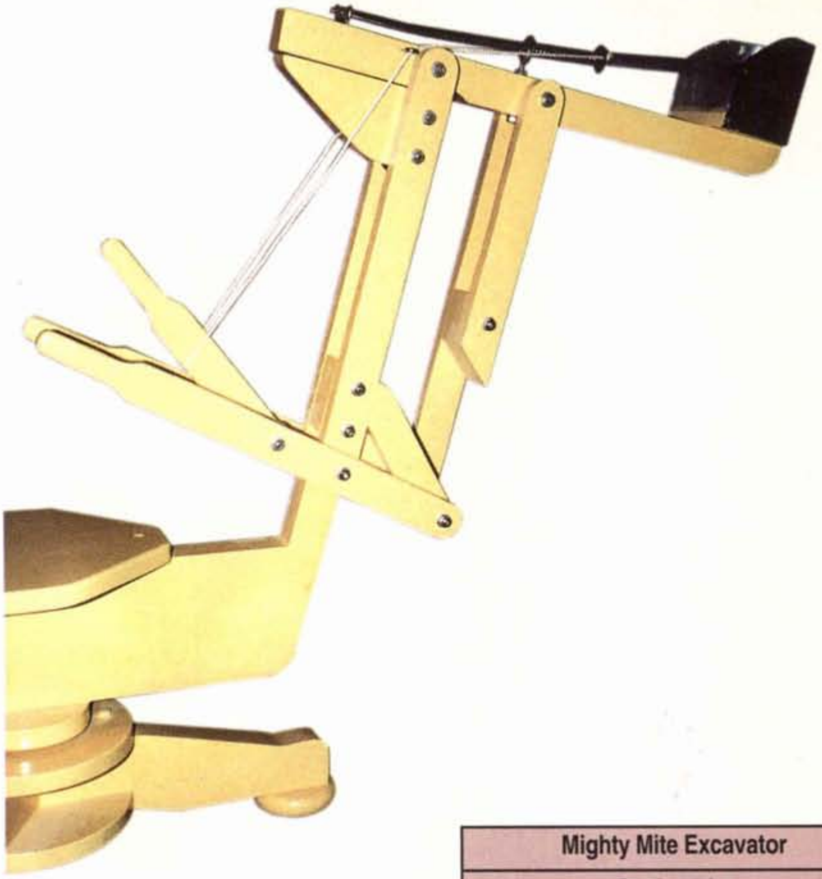
Booms and Bucket Beam

Cut out the two boom members (H) as shown in Figure 4. Lay out the hole locations on one boom member—stack them and line–drill through both pieces.

Cut out the boom stops (I) and (J) as shown in the PullOut™ Plans, then clamp the boom members to boom stops, using two ¼" bolts as alignment pins through the end holes. Once these parts are correctly aligned, line–drill through the boom members and both boom stops. Temporarily assemble these components using four ¼" X 3½" carriage bolts, flat washers and hex nuts. It may be necessary to use fender washers (.030" X ¼" id X 1½" od) as spacers during the final assembly.

Cut the bucket beam (K) to the dimensions given in the Cutting List. Locate and drill through holes in the bucket beam for the two bearings as located in Figure 5. Drill pilot holes for the three screw eyes and drill a hole for the eye bolt, as shown in the figure. Cut out and permanently install the bucket bottom (L), as dimensioned in Figure 6, onto the lower, front surface of the beam. Locate and drill pilot holes for the two RH wood screws which serve as retaining hinge pins for the sheet metal bucket.

Mighty Mite Excavator	
Qty	**Supplies**
1	½" diam X 10" iron rod, vert. axle
3	½" id fender washers, vert. axle
–	¼" id X 1½" od fender washers, as needed
2	⅛" diam X ¾" iron pipe, bearings
3	⅛" diam X 1½" iron pipe, bearings
2	¼" X 4" lag screws
2	¼" X 4" carriage bolts
1	¼" X 3½" hex head bolts
4	¼" X 5" hex head bolt
1	¼" X 3" hex head bolt
1	¼" X 2" hex head bolt
5	¼" X 3½" carriage bolts
15	¼" id flat washers
2	¼" id X 1" od flat washers
17	¼" hex nuts
1	.062" X 4" X 10½" sheet metal, bucket
1	.062 X ½" X 12" sheet metal, handle
1	¼" diam X 11½" iron rod
3	¼" id screw eyes
1	¼" X 2" eye bolt (⅝" id eye)
1	⅛" cable clip
1	#8 X ½" RH wood screw (cable clip)
1	compression spring–see text
1	⅛" X 4' nylon rope
2	3⁄16" tubular rivets
2	#10 X ¾" RH wood screws (bucket)
3	full–swivel casters (optional, for indoor use)



Check it Out

Temporarily install the central sub–assembly onto the base sub–assembly with two large area flat washers, ½" id, between the two sub–assemblies and on the vertical axle rod. Install the main boom sub–assembly onto its support bearing in the boom support with a ¼" X 5" hex head bolt. Install the bucket beam onto the front of the main boom sub–assembly with a ¼" X 3½" carriage bolt through the upper beam bearing.

Check for adequate back–swing of the bucket beam. It may be necessary to cut a radius into the back surface of the bucket beam at the point where it contacts the ¾" radius of the boom stop. A drum sander works well for this procedure and the beam is amply strong to allow for such a cut.

Actuating Components

Cut out the actuating components, (M), (N) and (O) as dimensioned in Figure 7. Glue the actuating lever assembly together, using a couple of finish nails to hold the pieces until the glue sets. Line–drill the three ¼" diameter holes as indicated. This sub-assembly is ready for final sanding.

Mighty Mite Excavator					
Cutting List					
		Finished Size			
Qty	**Part**	**T**	**W**	**L**	**Piece**
1	A	1½"	5½"	16½"	body
1	B	1½"	1½"	10"	boom support
1	C	¾"	5" diam		body support
1	D	¾"	10"	11¼"	seat
3	E	1½"	3½"	12"	legs
3	F	¾"	3½" diam		foot pads
2	G	¾"	8" diam		base reinforcement
2	H	¾"	1½"	17"	boom members
1	I	1½"	3"	7"	boom stop
1	J	1½"	3"	6½"	boom stop
1	K	1½"	1½"	21¾"	bucket beam
1	L	¾"	4"	4"	bucket bottom
1	M	¾"	1½"	18¼"	boom actuator–long
1	N	¾"	1½"	12"	boom actuator-short
1	O	1½"	1 9⁄16"	3 7⁄16"	spacer/stop
1	P	¾"	1½"	17¾"	boom control lever
1	Q	¾"	1½"	17¾"	boom control lever
1	R	¾"	1½"	10"	bucket lever
1	S	1⅛"	1¼" diam		spacer/bearing
1	T	¾"	1½"	7"	brace

Exploded Perspective

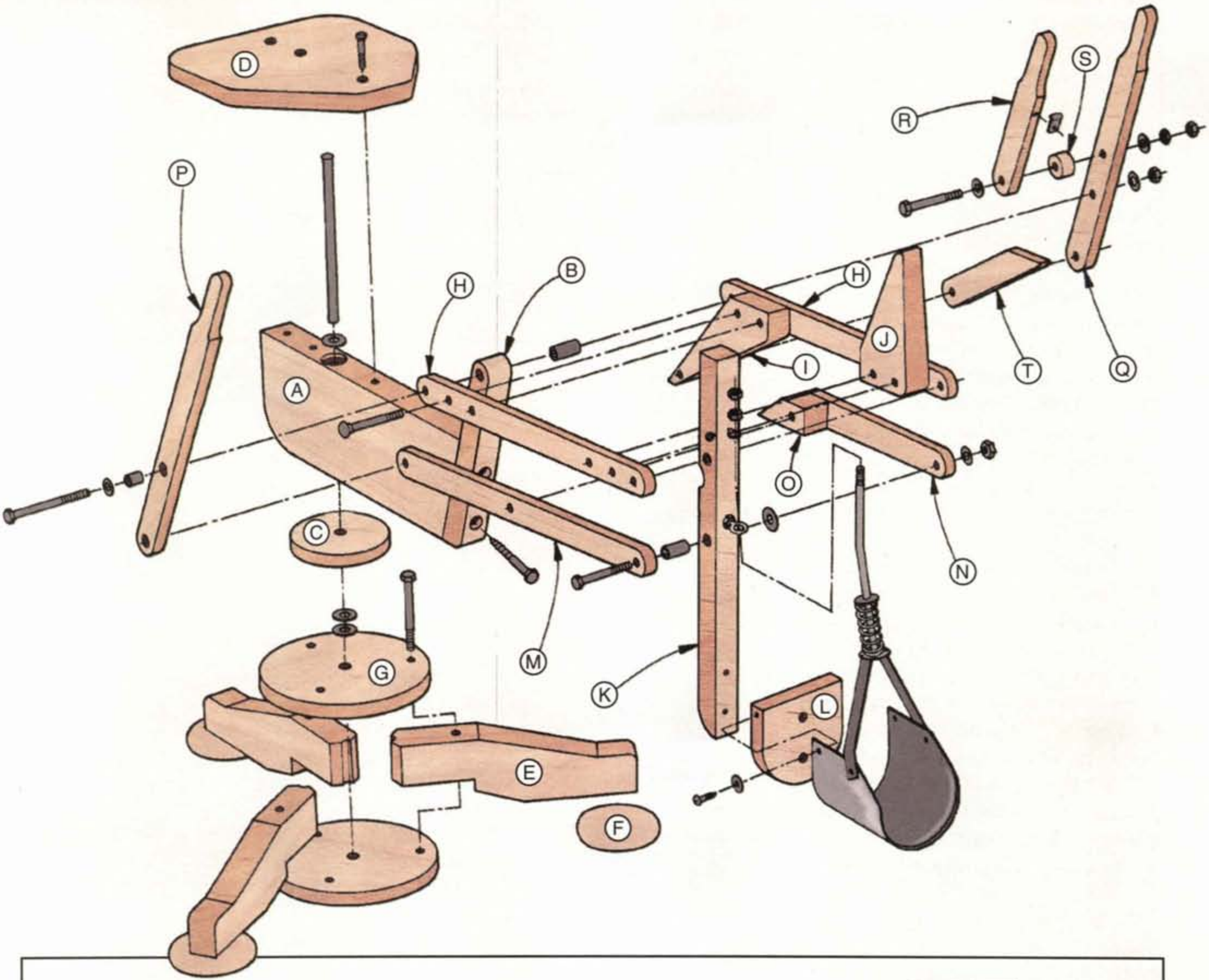
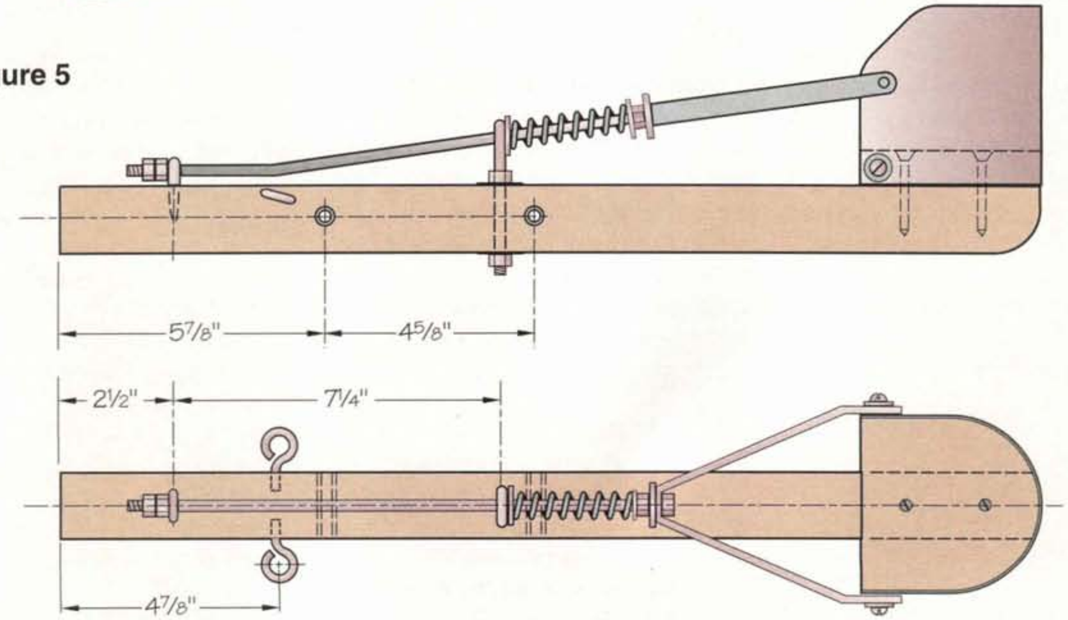


Figure 5



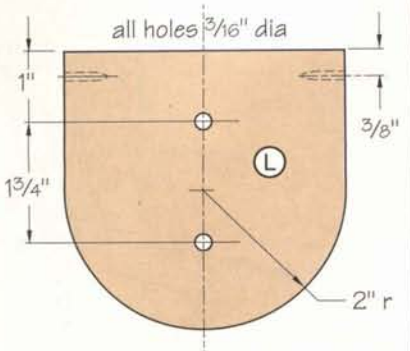


Figure 6

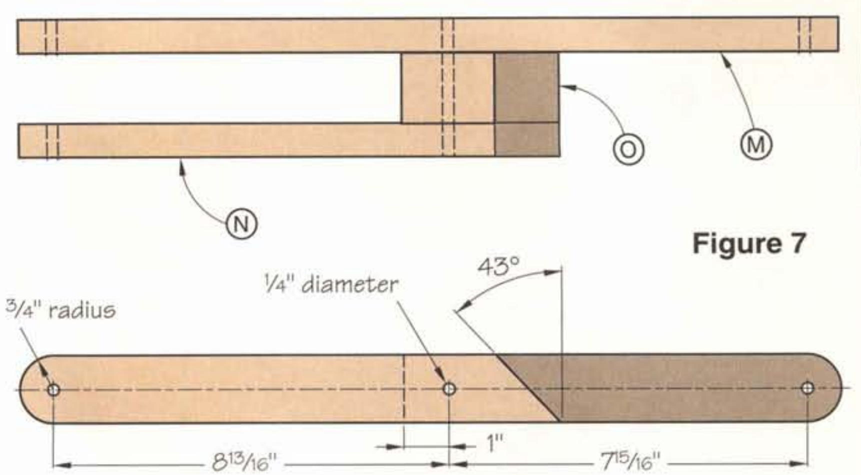


Figure 7

Cut out two control levers (P) and (Q), the bucket lever (R) and the spacer (S) as dimensioned in Figure 8. Fit the right hand lever (P) with two bearings as shown in the figure. The spacer is permanently attached to the bucket lever with two galvanized nails.

Temporarily install the levers onto the main bearing bolt, and the actuating assembly (M), (N), and (O) in place on the right hand lever (P). Attach the front end of (M), (N) and (O) onto the lower bearing of the bucket beam. Tighten all the hardware to a snug condition and check for freedom of movement and extent of travel for all wood parts and their bearings. This is where it will be determined how many fender washers and at which locations they will be needed.

Make the brace (T) as shown in Figure 9. The two levers (P) and (Q) should be parallel at exactly the same time that the bucket beam (K) comes against the stop (J) of the main boom assembly. Bolt the brace between the left hand boom control lever (Q) and the boom stop (I) and pilot drill for a galvanized finishing nail through the brace and slightly into the boom members as shown on Figure 10. Temporarily install a finishing nail part way in place and check again for correct operation.

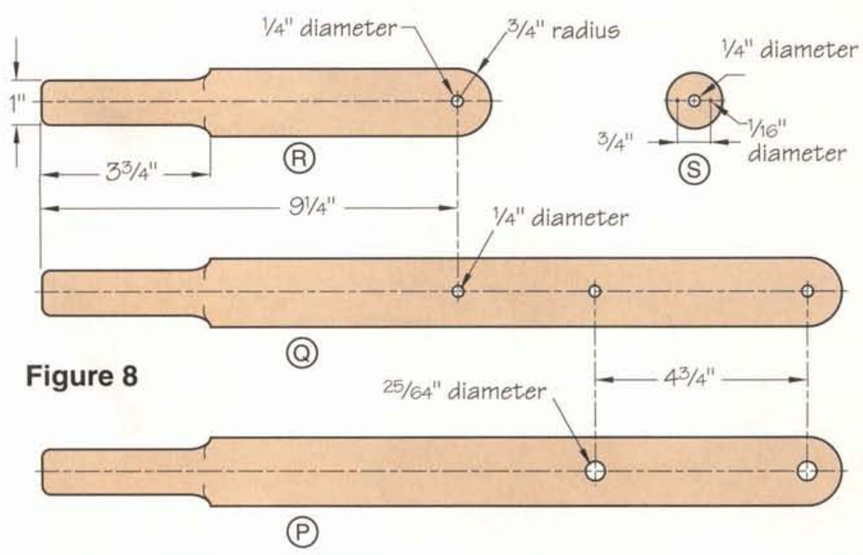


Figure 8

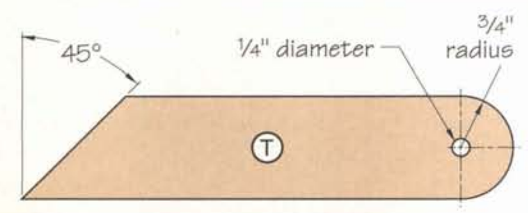


Figure 9

Assembly

Once the proper travel and freedom of operation has been found, disassemble all the sub–assemblies and note the number and location of all the fender washers (.030" X ¼" id).

Sand and finish all exposed surfaces at this time. Re–assemble the finished components, including the appropriate washers, checking for freedom of operation and travel of the members. Tighten down all the bolts. It's not necessary to secure the lower end of the ½" vertical axle. It isn't going to move. No lubrication is necessary—nor desirable. Permanently secure the boom levers, boom members and braces together. Install the bucket lever and spacer onto the left hand lever using a ¼" X 3" hex head bolt, fender washers, a ¼" lock washer and ¼" hex nut.

Bucket

Cut the bucket to the shape shown in the PullOut™ Plans and form the sheet metal bucket by tightly wrapping it around a 3½" diameter can. Its inherent spring back will bring it to about a 4" diameter. File smooth all sharp cut edges and attach it to the bucket bottom with two #10 X ¾" RH wood screws and flat washers.

Drill a ¼" diameter hole through the .062" X ½" X 12" bucket handle at its center and on the centerline. Drill 3/16" holes through both ends, 3/8"

Figure 10

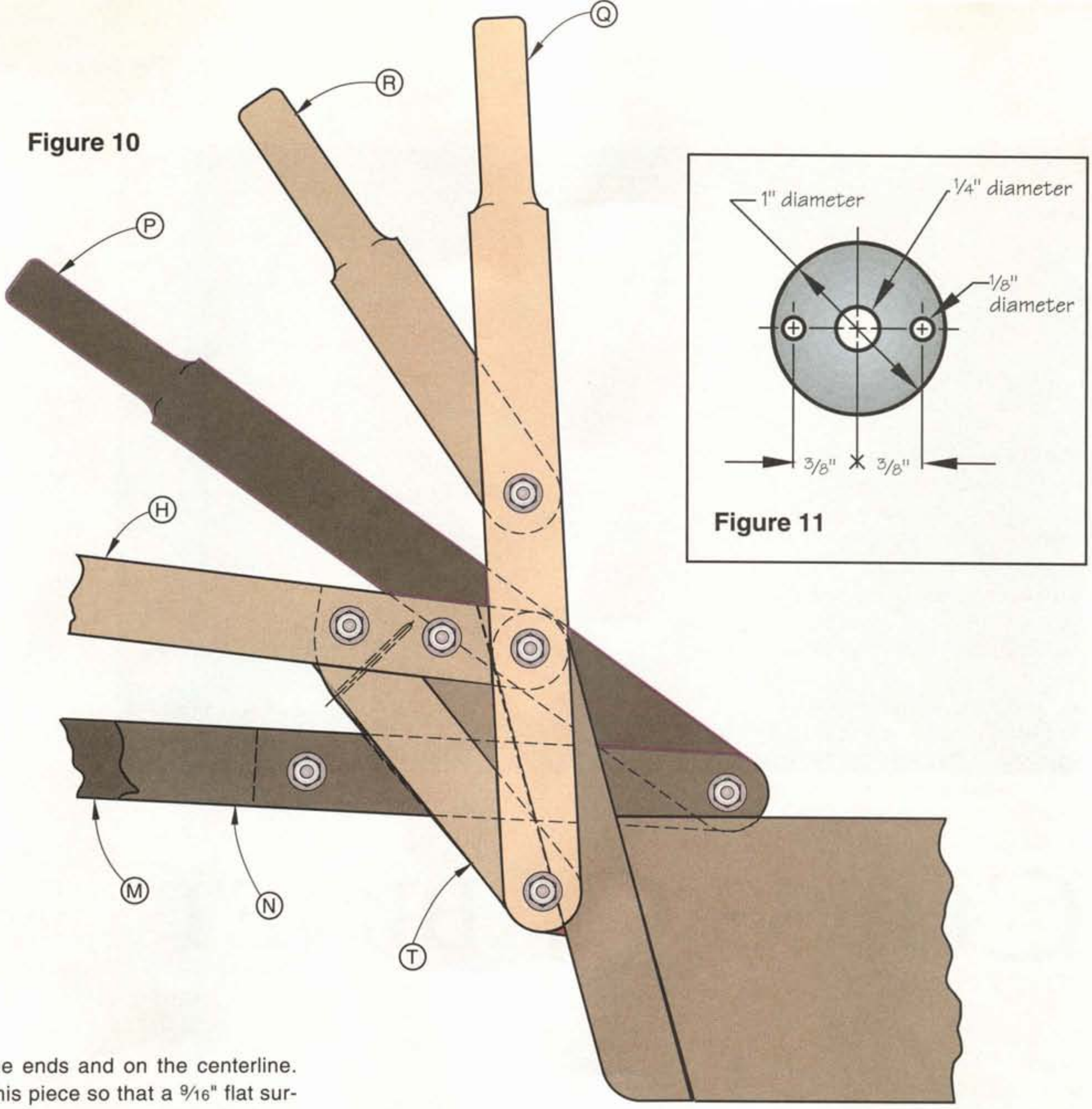


Figure 11

from the ends and on the centerline. Form this piece so that a 9/16" flat surrounds the center 1/4" hole (see Figure 5). Bend each end a few degrees 1" from the ends. Attach this piece to the bucket with 3/16" tubular rivets and flat washers—allowing for freedom of movement.

Run 1/4–20 threads for 3/4" on each end of a 11½" length of 1/4" diameter rod stock. Make a 5° bend 2" from the upper end of this rod and install two 1/4" hex nuts, as shown in Figure 5. These will be adjusted on final rigging.

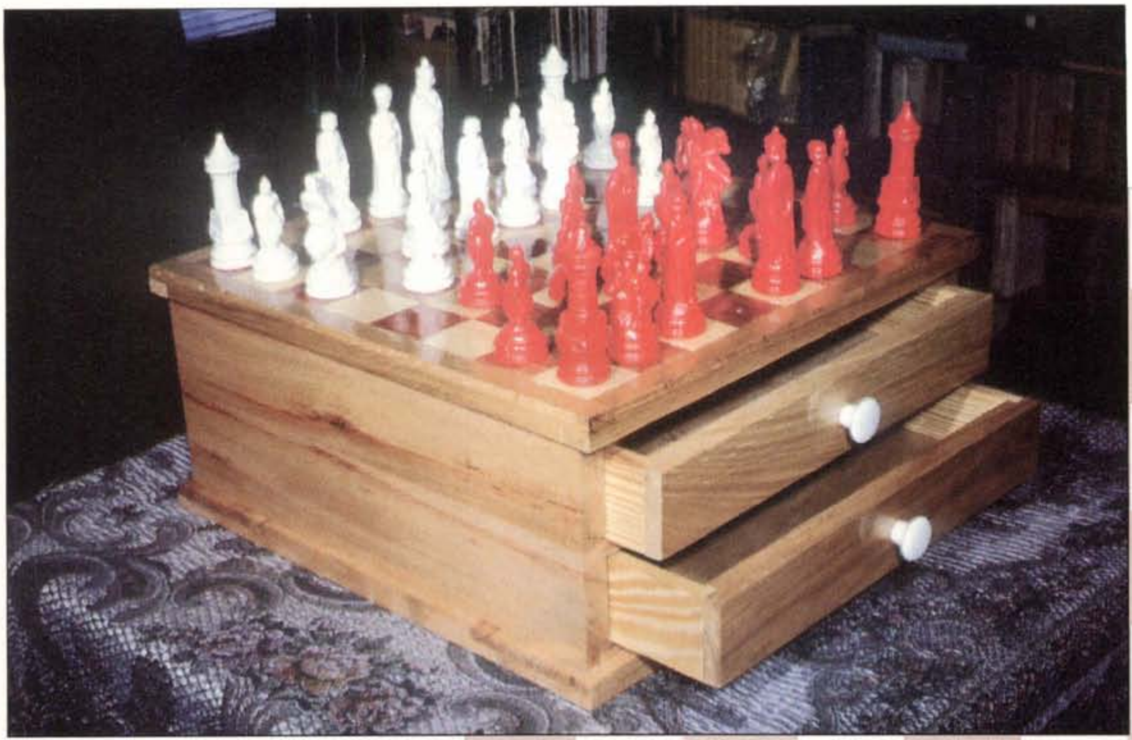
Drill two 1/8" diameter holes in a 1" od flat washer as shown in Figure 11. Pass the 1/4" rod in succession down through the upper screw eye, then through the eye bolt, a 1/4" flat washer, a suitable compression spring, a 1/4" hex nut, the drilled 1" OD flat washer, the center 1/4" hole in the bucket handle, and a final 1/4" hex nut. Tighten the lower hex nuts securely in place, making certain that the two 1/8" holes through the drilled washer are located right and left with respect to the bucket and to the slight bend in the upper end of the rod.

Adjust the upper hex nuts so that they stop the bucket in its exact closed position (no gap, no over–bite). Pass a 1/8" nylon cord through one of the drilled holes in the actuating washer and knot it securely on the underneath side. Apply a drop of glue or paint to the knot.

Pass the free end of the cord through the appropriate screw eye on the upper end of the bucket beam, through a clip located on the bucket lever, back through the opposite screw eye in the bucket beam, and again through the opposite hole in the drilled actuating washer. Temporarily knot the cord.

With the bucket fully open, and the bucket beam against its stop, secure the bucket lever in parallel position with the right hand and left hand levers. Tighten the nylon cord and knot it securely just below the remaining 1/8" hole in the drilled washer. Tighten the cord clip on lever (R).

The Mighty Mite Excavator is now assembled and rigged for many hours of service–free operation on the most demanding of contracts. PW



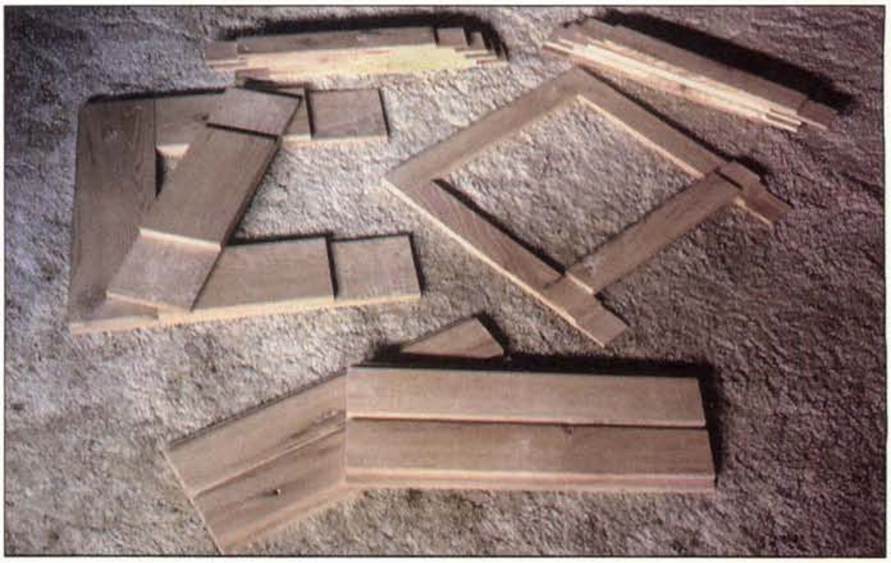
CHESS CABINET

by Dana Martin Batory

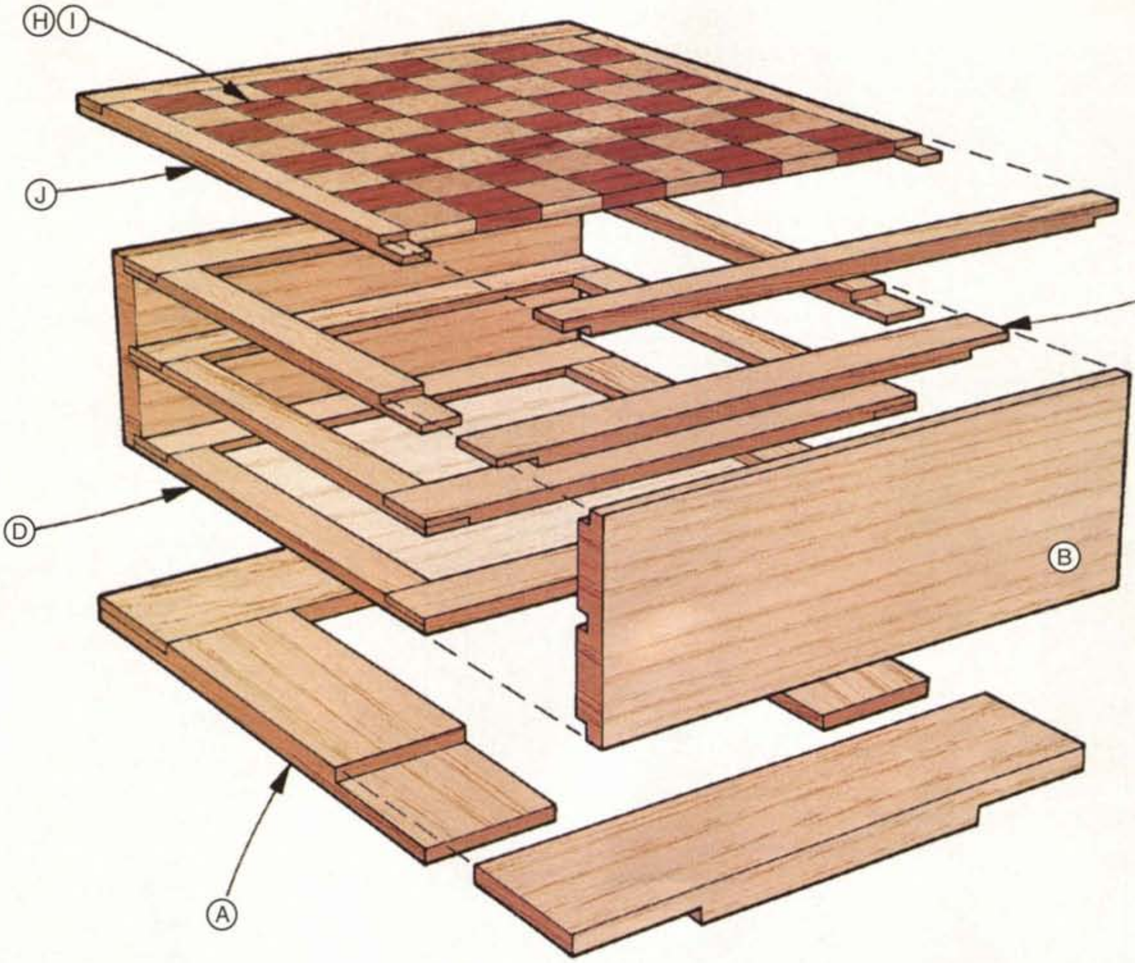
This small, sturdy combination unit is designed to hold chessmen and chess books and can serve as a board for chess or checkers. The two drawers are designed to open from either end so each player can set up his own men.

The cabinet is best built in four stages—the base, cabinet, drawers and top. The base, frames, and moldings all use lap joints. Sand,

Pieces cut, sanded, varnished and waxed—ready for assembly.

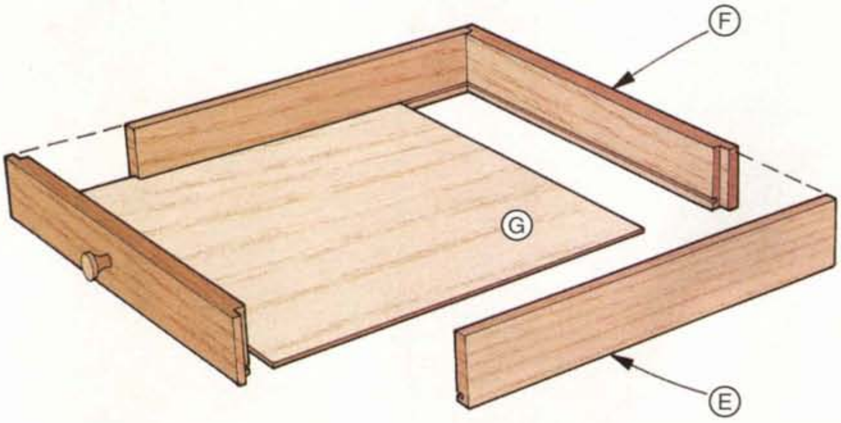


***Dana Martin Batory** is a writer and cabinet maker who is particularly fascinated with reproducing Shaker furniture at one–twelfth scale. He also collects and restores antique woodworking equipment and is a founding member of the American Antique Power Tool Association.*



Cabinet Assembly

Chess Cabinet					
Cutting List					
		Finished Size			
Qty	Part	T	W	L	Piece
4	A	¾"	4"	18"	base pieces
2	B	¾"	6½"	17"	sides
6	C	½"	2"	17"	frame sides
6	D	½"	2"	16¼"	frame ends
4	E	½"	2½"	16¼"	drawer sides
4	F	¾"	2½"	15½"	drawer ends
2	G	⅛"	14¾"	16"	drawer bottoms
4	H	¾"	2"	16"	red strips
4	I	¾"	2"	16"	white strips
4	J	¾"	1"	18"	molding



Drawer Assembly

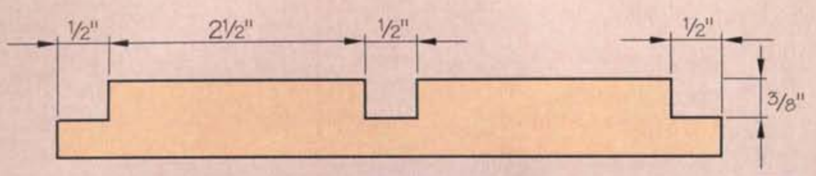


Figure 1. Cabinet Side (B)

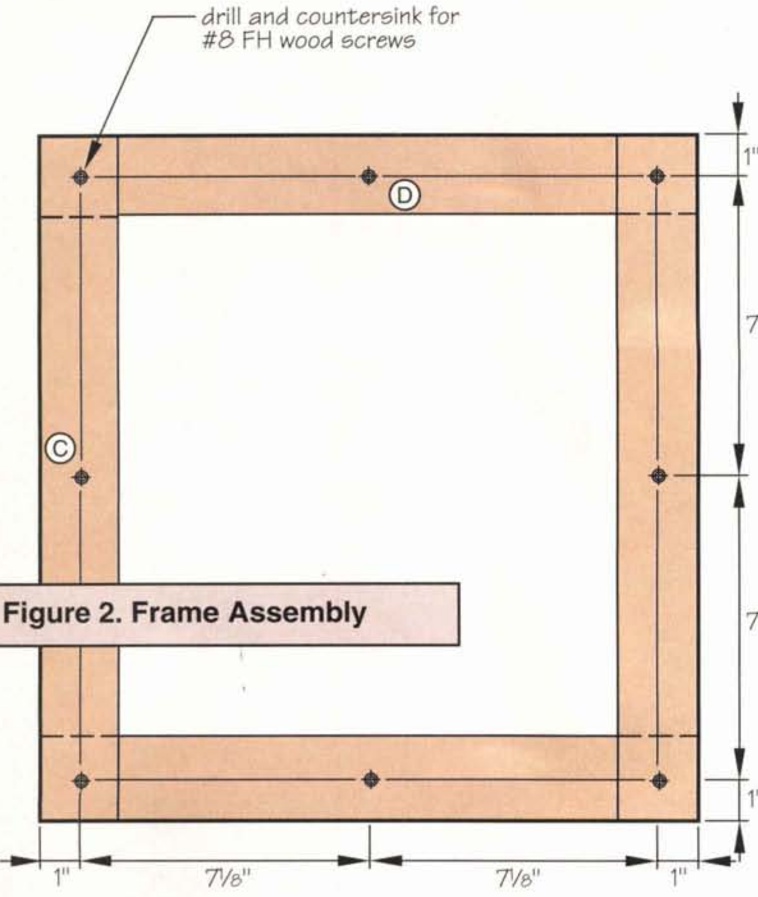


Figure 2. Frame Assembly

varnish, and wax all parts before final assembly, carefully leaving bare all surfaces that will be glued. When dry, excess glue can be popped off with a fingernail.

This cabinet was built from red oak. The four strips which make up the white squares were cut from poplar. The strips which make up the red squares were cut from red oak. For an antiqued look the four red oak strips were stained mahogany, varnished, and sanded through to expose the oak.

Base

Cut all of the parts to the sizes given in the Cutting List. Lay out and cut lap joints, 4" wide X 3/8" deep. in both ends of all four base (A) pieces. Dry assemble the base pieces to check fit. Sand, varnish and wax the pieces, then glue and clamp them together.

Cabinet

Lay out and cut the two rabbets and one dado in each side (B) as shown in Figure 1. Sand, varnish and wax the pieces and set them aside.

Lay out and cut lap joints, 2" wide X 1/4" deep in both ends of each frame side (C) and frame end (D). Dry assemble the three frames to check the fit. Sand, varnish and wax the pieces; then glue and clamp them

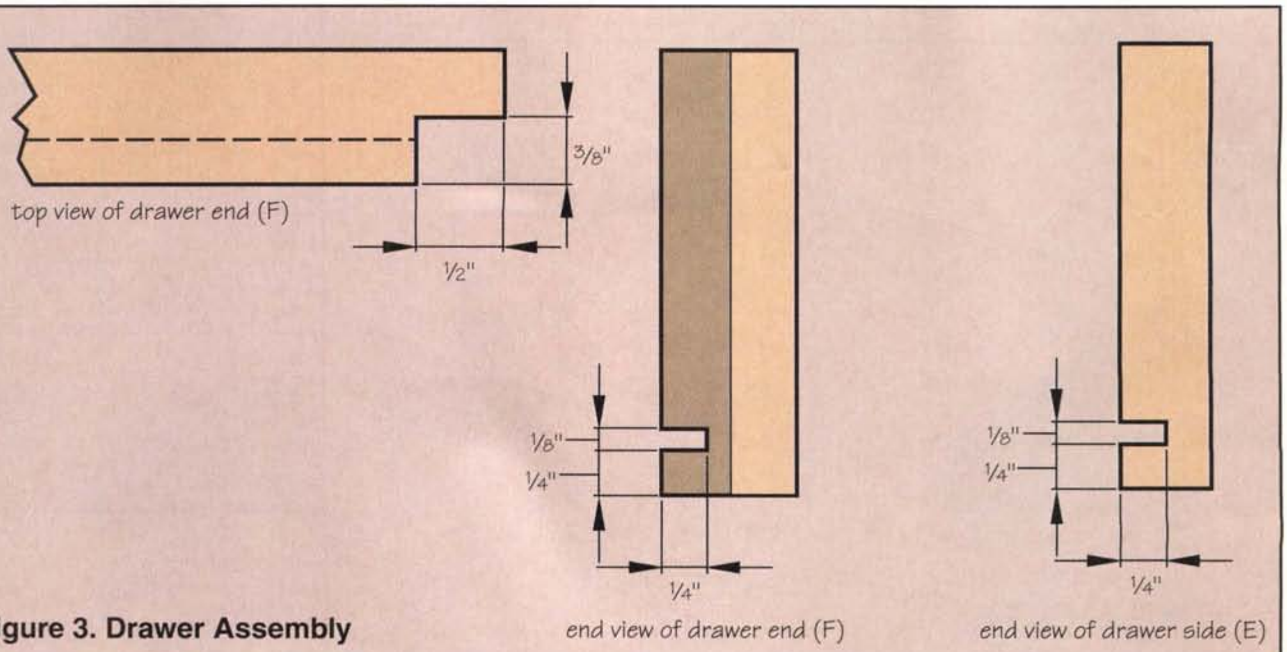

3/8"
top view of drawer end (F)
½"
1/8"
1/4"
1/4"
end view of drawer end (F)
1/8"
1/4"
1/4"
end view of drawer side (E)

Figure 3. Drawer Assembly

together. When the glue is dry, drill and countersink eight holes in the top and bottom frames as shown in Figure 2. Glue and clamp the frame assemblies between the sides. Center the assembled carcass on the base, and fasten it to the base with flat head wood screws.

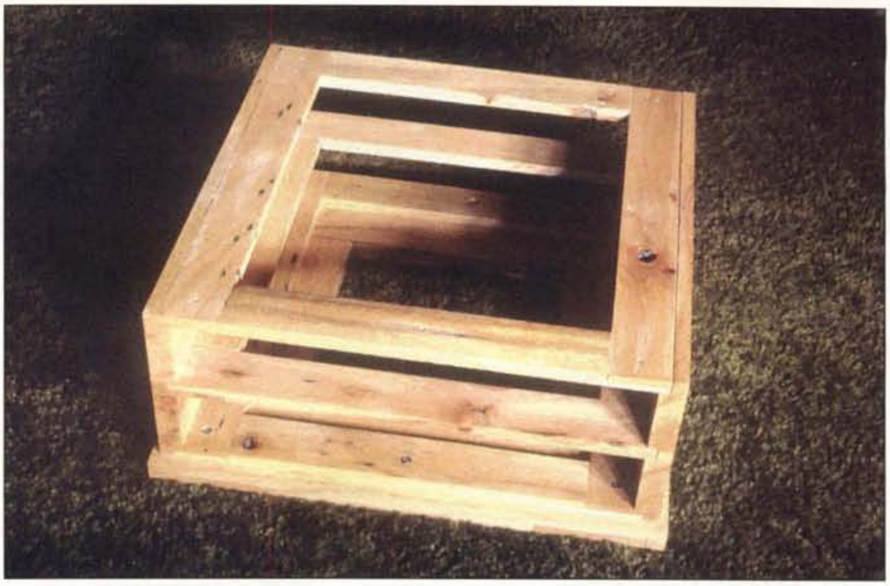
Drawers

Lay out and cut the rabbets and dadoes in the drawer sides (E) and drawer ends (F) as shown in Figure 3. Dry assemble the pieces and check the fit of the drawers in the case. Sand, varnish and wax the pieces, then glue and clamp the drawers together. Do not glue the bottoms (G) in place; they should be free to float. Fasten a drawer pull in the center of each drawer end.

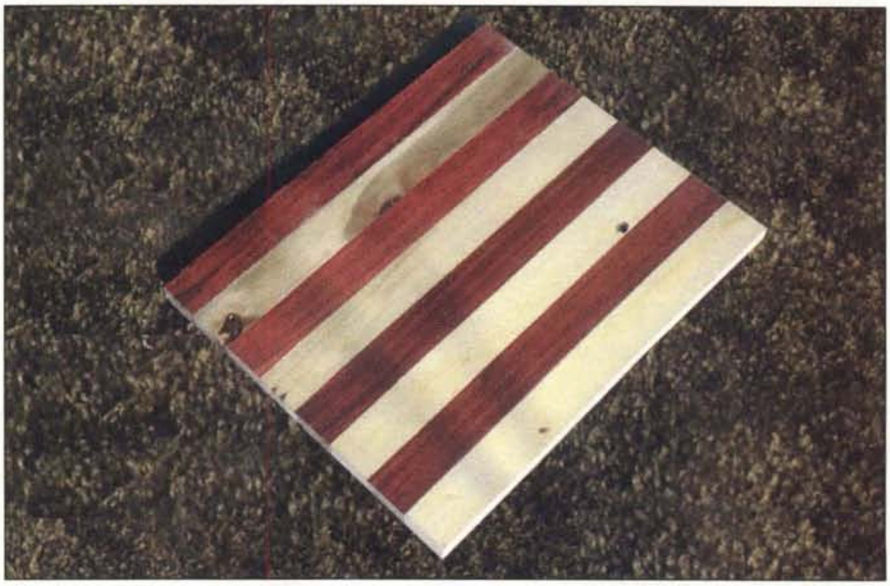
Top

Sand, varnish and wax the strips for the squares (H) and (I), then glue and clamp them together. After the glue is dry, crosscut this assembly into 2" wide strips as shown in the photograph. Reglue the strips, alternating the colors.

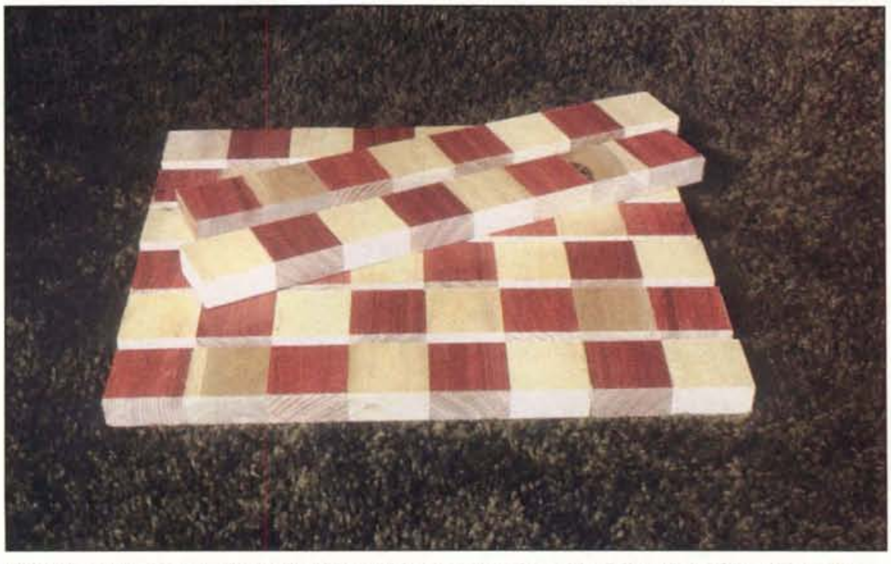
Lay out and cut lap joints 1" wide X 3⁄8" deep in the molding strips (J). Dry assemble to check the fit, then glue and clamp the molding to the top. Soften the edges of the assembled top with a roundover bit or a chamfer bit after the glue is dry. Sand, varnish and wax the molding strips. Fasten the finished top to the carcass with flat head wood screws. PW



Final base and cabinet assembly—ready for the drawers and top.



Top strips are cut 2" wide and glued together.



After the glue is dry, the striped board is crosscut into 2" wide strips. Glue the new strips together alternating colors to create a checkerboard pattern.

CARVE A LOVE SPOON

by Jack Ekstrom

Looking for that special gift—one that's more special because you made it? Give your loved ones carved wooden spoons and they'll always remember you. Carved spoons can be functional as well as decorative. Carve two at the same time and you'll have one to use and one to give away.

Love spoons originated in Wales in the 17th century. Carved by young men, they were given as tokens of affection. According to *Love Spoons from Wales*, published in 1973 by the Celtic Educational Services Ltd., the oldest known spoon is dated from 1667 and is found at St. Fagan's Castle in Cardiff.

There are endless designs for love spoon handles. Traditionally the designs included a heart, but the challenge was to tell a story in the handle. Two intertwined stems stood for the growing love of two people; a ball in a cage meant the carver's heart belonged to the other; links in a chain indicated the number of children desired; a knot indicated secure love.

The spoon itself is one of the most basic cooking utensils, and has been in use around the world for thousands of years. Wooden spoons usually don't last, as you've no doubt noticed if you've used one to cook with. Any kind of wood is good to use; but the harder the wood, the longer it lasts. Softer woods are best for carving, especially if you're making an intricate handle. Love spoons are generally used as a wall decoration.

While it was the Welsh who turned spoon carving into an art form, today it's become increasingly popular thanks in large part to the development of an important tool: the bent knife.

***Jack Ekstrom** is a writer and illustrator from Colorado and the former editor of* The Mallet, *the journal of the National Carvers Museum.*

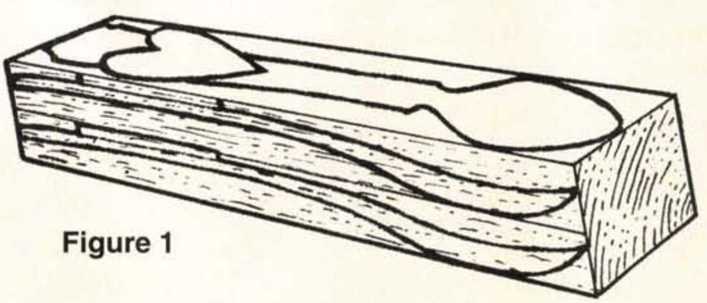
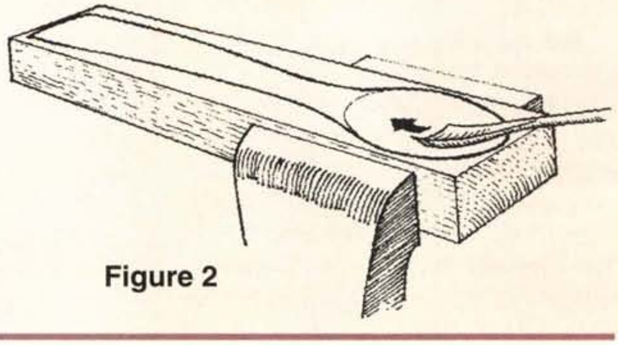


Figure 1



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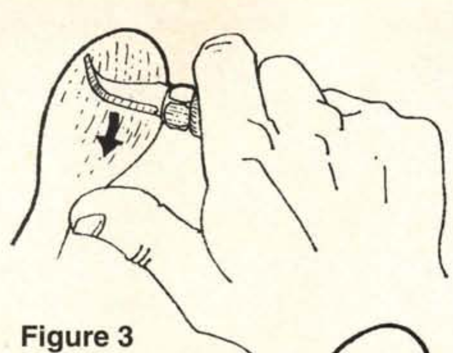

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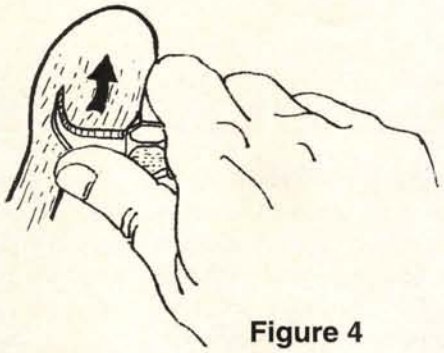

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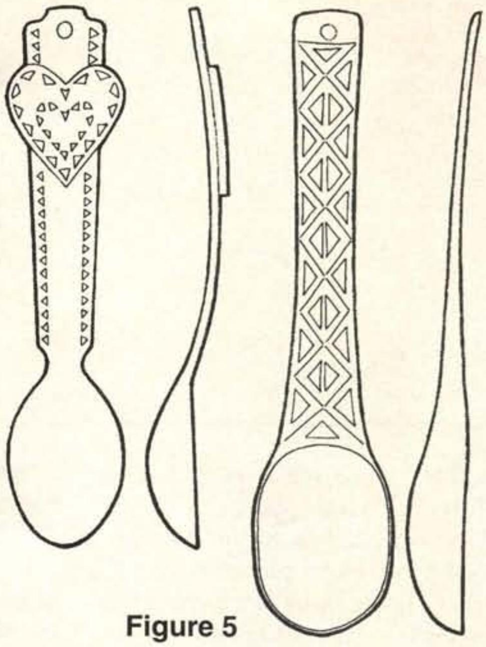


Figure 5

Bent Knife Blades

While you can use a gouge for this project, I've found the best tool is a knife with right– and left–handed bent blades. The different bent blades have important functions no matter whether you're right– or left–handed. You should get both blades, either the small or large sizes.

Warren Tool Co. (see ad page 95) has knives and basswood blanks measuring 3" X 3" X 9 1/2"—they're perfect for carving two spoons (Figure 1). Ideally, you should try to find wood with a curved grain to fit the curve of the spoon.

Bent knife blades are remarkably safe tools. But as with any carving tool, the sharper the safer; they're certainly more fun to carve with. Bent blades are honed by pulling them swiftly over rolled leather or by using a tapered diamond abrasive hone.

Gouging

The trouble with using a gouge to shape the inside of the bowl is that you don't have any good way of holding the spoon to finish the carving. You can hold it by the handle and carve half the bowl, but the other half is harder because you have nothing to hold onto. The best solution is to put the blank in a vise and gouge the inside bowl before you saw the outside profile (Figure 2).

A bent knife blade makes carving the inside of the bowl easy and fun—you never need to let go of the spoon handle. Use one curved blade to carve the first half of the bowl, pulling the knife toward you (Figure 3); then use the other curved blade to carve the second half by pushing away (Figure 4).

The more you carve, the more handy uses you'll find for the bent blades and you'll wonder how you ever got along without them.

Saw the Spoon

Carving two spoons is a good idea because it's just as easy to saw two spoons as one. If you've never carved spoons before, you can use one for practice and one for the final project. First draw the top view and two side views (Figure 5) on the blank. Start with the side view and saw the top surface of both spoons (Figure 6). Don't saw the bottom of the handles yet; leave yourself plenty of wood to hold onto. Tape the pieces back together and saw the top view.

Some carvers prefer to hollow out the bowl first and then carve the bottom. As long as you're at the saw, it's just as easy to saw the round bottom side views of the spoons now. Beginning carvers get discouraged by trying to remove too much wood with their knives. Shaping the bottom of the

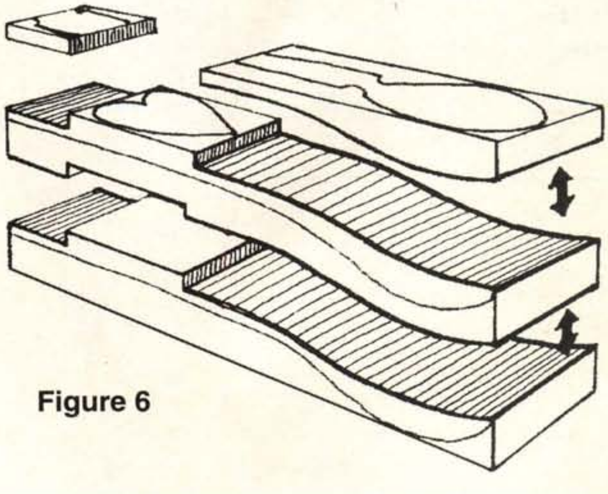
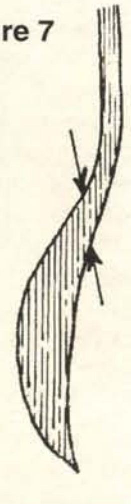


Figure 6



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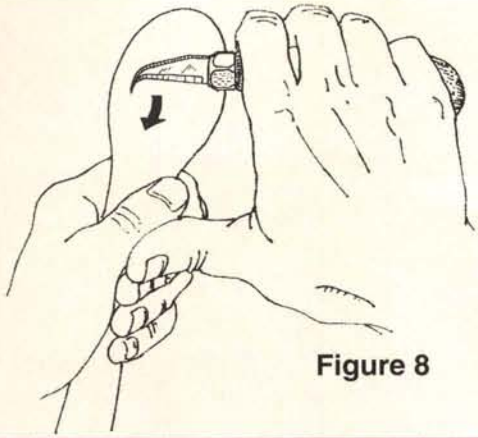


Figure 8

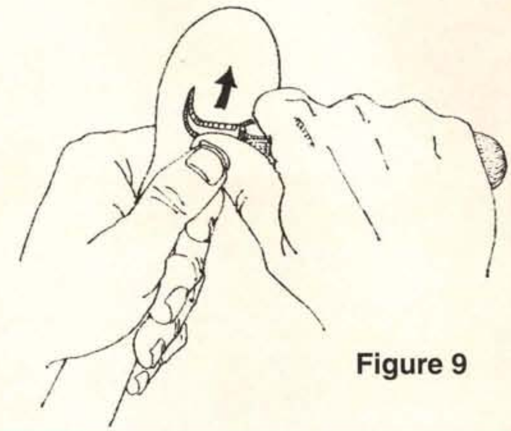


Figure 9

spoon first gives you a gauge to measure the inside bowl depth.

Before you saw the bottom of a spoon bowl, determine whether the spoon is going to be functional or not. Cooking spoons are straighter than decorative spoons. For a cooking spoon, you need strength at the point where the handle meets the spoon bowl (Figure 7). Most love spoons are thinner in this area, like this fine heart spoon carved by Maggie Hanshaw of Colorado Springs. Be extra careful as you carve in this area.

Shape the Bowl

Cut no more than 1/8" deep at a time as you shape the inside of the spoon. Make shallower cuts as you finish the shape. Scrape with the edge of the bent blade to smooth the surface. Sharpen your blade on a stone after scraping.

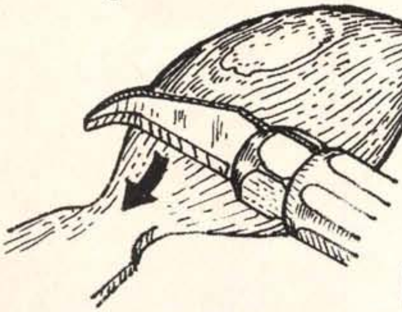
Draw or imagine a line about 1/16" in from the edge of the spoon and carve to that line; you'll finish the edge of the bowl later. As you begin to carve the tip of the bowl, hold the handle with your left hand and pull the blade toward you. Hook your carving thumb on your other thumb and use your carving forefinger to control the depth of the cut (Figure 8).

Make several cuts the length of the bowl. As you cut deeper and reach the edges of the bowl, you'll discover that your blade begins to catch in the grain of the wood. Turn the spoon around or use the opposing curve bent blade.

The reason experienced carvers have many different tools is for safety; there's a perfect tool for every job. Using a tool that doesn't fit the job is a good way to cut yourself.

Hold the spoon by the handle with your *other* hand and push the second bent blade. Put one thumb on the other and push with both (Figure 9). Start at the edge of the bowl where it meets the handle and push the blade toward the tip of the spoon, scoop it into the wood by twisting your carving wrist.

Figure 10



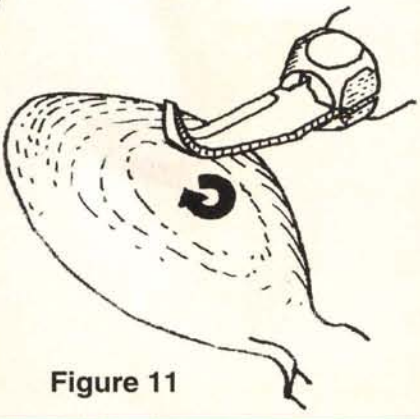


Figure 11

Finish The Bowl

As you carve deeper in the bowl, check the thickness with your forefinger and thumb. The challenge is to make the wood as thin as possible. Turn the spoon over and use this same procedure for finishing the bottom of the bowl. While a straight–edged knife can be used for the bottom of the bowl, it can also be carved with the straight part of the bent blade (Figure 10). Bent blades are especially handy for carving the gentle curve on the bottom of the spoon where the bowl meets the handle, but save this step until later.

If you've kept your knives sharp, you shouldn't need to sand the bowl. Smooth the knife marks out by scraping the surfaces with the edges of the bent blade, then burnish with the curved, flat outer edge (Figure 11).

The Lip

When you're satisfied with the thickness of the bowl, carefully finish the edge, or lip. Bring it to as sharp an edge as you desire. Since you're going to have to hold the spoon by the bowl to finish the handle, you may want to wait until the end to sharpen the lip of the bowl. Avoid any chips, dips or mars on the lip.

The Diet Spoon

If at some point you miscalculated the thickness of the bowl and put your knife all the way through it, don't

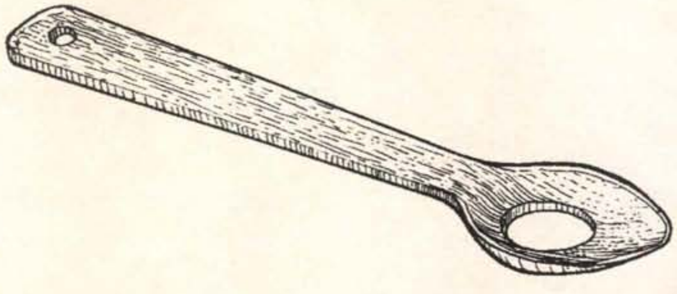


Figure 12

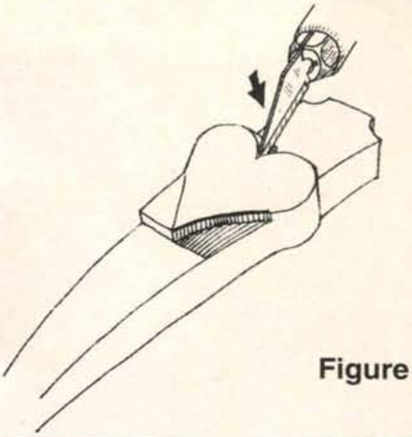


Figure 13

despair. You now have a very special humorous gift to give: The Diet Spoon (Figure 12). Simply make the hole large and round. Smooth the edge of the hole as you did for the lip of the bowl. Give the handle a simple finish because the focus has gone from the handle to the hole. Just be careful whom you give it to; some people may not find it very funny. Functionally, this style is also used to stir sauces.

Finish the Handle

Carve the top of the handle before you saw the bottom to shape; you want as much strength under it as possible while you're pushing down. Be careful not to put any stress on the crucial point between the bowl and the handle.

You need a straight–edged knife to V-cut around the big heart (Figure 13) and to finish the handle. The heart is at least 1/8" above the handle and the top of the handle is smooth to the edge of the heart. Make the line that connects the heart to the handle very sharp and clean. Smooth the entire top of the handle and heart before applying the chip design.

Chip Carving

There are two chip–designs given here (Figure 5). If the heart proves too difficult, you can remove it and carve the simpler chip–design. Chip carving is a popular method of decorating wood surfaces and is at least as old as love spoons. Chip–designs are always made from triangles. A chip–cut is a *three–sided* cut made with the point of the knife. Each *cut should* be clean and sharp and all three cuts should meet in the middle—the chip should come out cleanly (Figure 14).

Carefully draw the design with a pencil on the prepared surface before cutting. If you haven't tried chip–carving before, practice first on a scrap piece of wood.

Finish the Handle Bottom

After the chip–design is finished, carefully saw the bottom of the handle, remembering not to apply pressure to the bowl. V–cut the bottom of the heart the same as the top (Figure 15). The handle is 1/8" thick under the heart. Except for the heart, the handle is the same thickness from the end to the bowl. Sandpaper helps on the handle, but since the grains of sand which are inevitably left on the wood dull knife blades, be sure to sand only at the very last. The best finish is mineral oil, especially if the spoon is to be used for cooking.

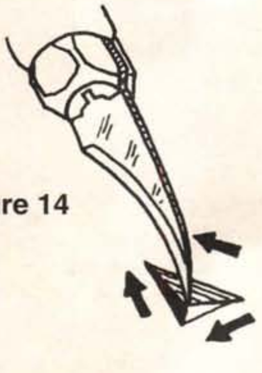


Figure 14

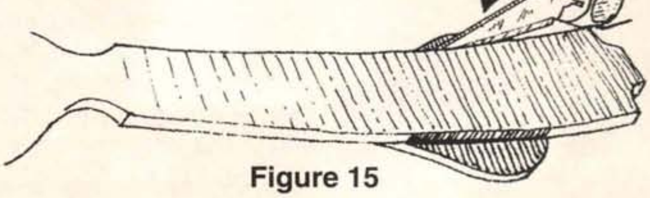


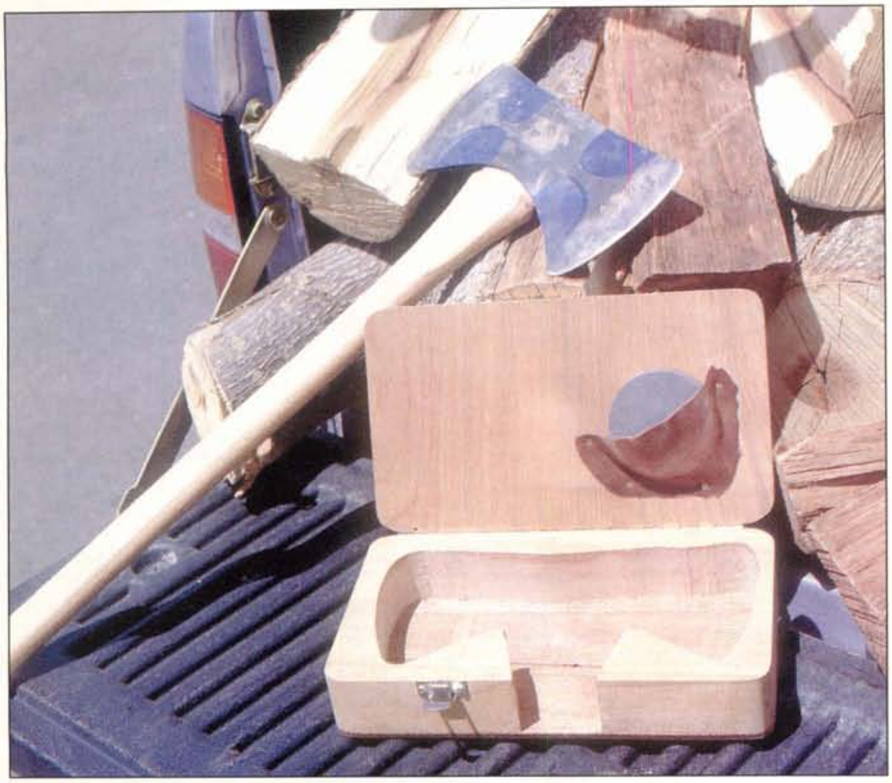
Figure 15

Carved Knives

Fancy carved handles aren't unique to spoons. Wooden knives, used as letter openers, are another popular carving project. These will be discussed in another article, but since you've just carved a spoon, you may be able to figure out how to carve a knife since the two are so similar. Carve them with matched handles. And you might as well throw in a fork while you're at it. PW

Safety Rules for Bent Knives

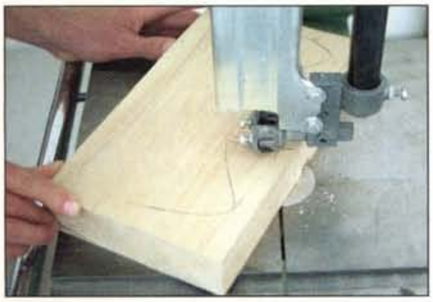
1. Always place the knife sharp edge down.
2. Keep wood between the blade and your thumb when pulling the knife toward you.
3. Use both hands when pushing the knife.
4. Always look out for the fingers on your other hand.
5. Only cut small depths at a time.
6. Keep the knife sharp on a round leather hone or tapered diamond abrasive hone.



Axe Cover

A Popular Woodworking Project

The spacer is made from soft wood to keep the cover light.



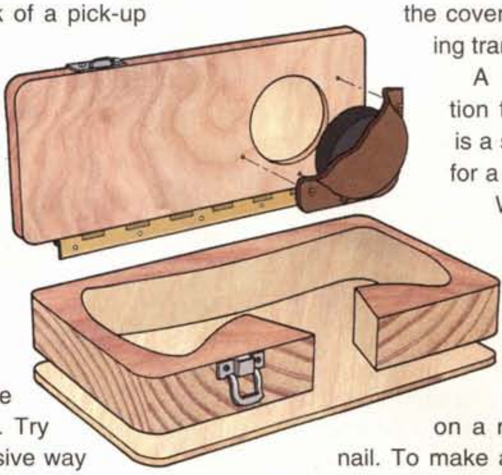
Cut out and remove the inside of the block to form the spacer.

The honing stone is held securely in the recessed groove by a leather cover.

by Don Kinnaman

Last fall, several teachers sent their axes to my woodworking shop to be sharpened. With a half dozen of the finely honed instruments leaning against the walls of my shop I became concerned about safety, fearful that a student might accidentally kick or trip over a sharp axe bit. I also wanted to make sure that the freshly honed axes got to their job site without being bent or dulled in the back of a pick-up truck. That's when the idea to make a few simple covers came to me. Because the axes were of various shapes and designs I needed to make a custom cover for each. The following is an example of a cover I made for a double-bit axe. Try one—it's an inexpensive way to protect your axe during transport and helps to avoid possible injury.

Trace the pattern of your axe head on a block of wood that has a thickness greater than or equal to that of the axe head. The double-bit axe cover shown here measures 11¾" X 6¾" and common two-by lumber was used for the spacer block. Although the axe head is ¾" thick, the extra thickness in the spacer offers the option of adding a honing stone. Cut the pattern out on the band saw to form the spacer. Cut a piece of ¼" plywood equal in dimension to the outside perimeter of the spacer. Permanently attach it to the bottom of the spacer block with glue and finish nails. Make the top the same profile as the bottom but use ½" plywood. Attach the top with a piano hinge or simple butt hinges and use a slam latch to fasten the lid closed. I used the latch from an old tool box. It's important that the latch be secure so there's no threat of the cover opening during transport.



A handy addition to this design is a storage space for a honing stone. When cutting wood in the field there is always the possibility of nicking the blade on a rock or errant nail. To make a pocket for a round stone such as shown here, use a 2½" Forstner bit and drill halfway through the plywood lid. Take a piece of leather and stretch it over the stone. Fasten the leather with a few ½" (or shorter) brass wood screws. The stone fits in the pocket, locking itself in the shallow hole. PW

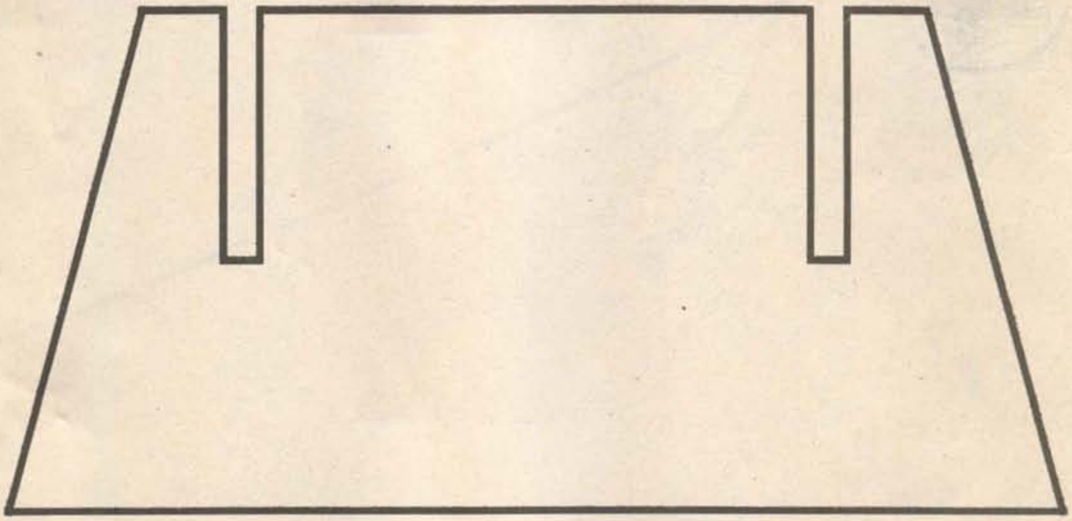
***Don Kinnaman** is a retired shop teacher from Phoenix, Arizona.*

Carefully open staples to remove plans, then bend them closed again.

Popular Woodworking No. 75

November 1993 (pages 43-58)

PullOut™ Plans



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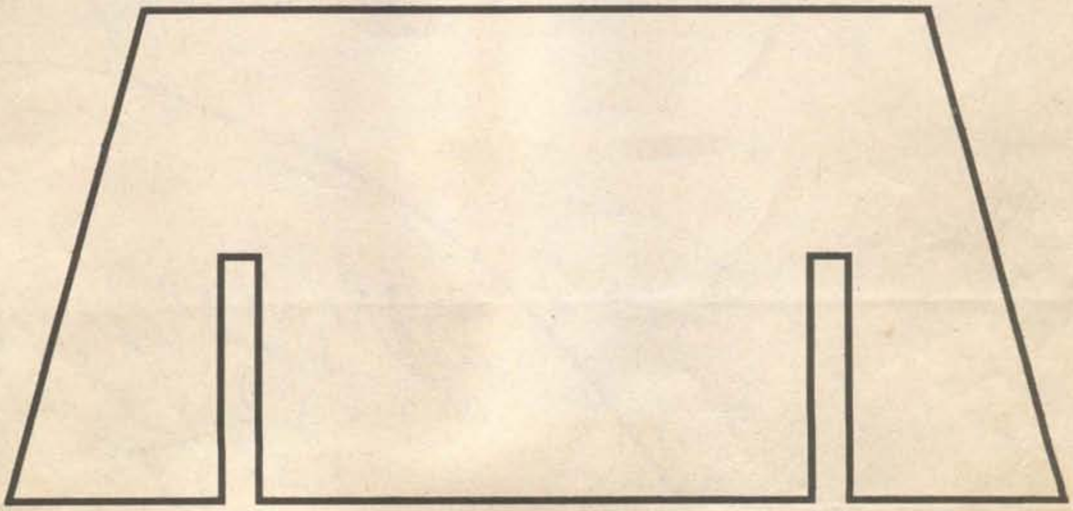

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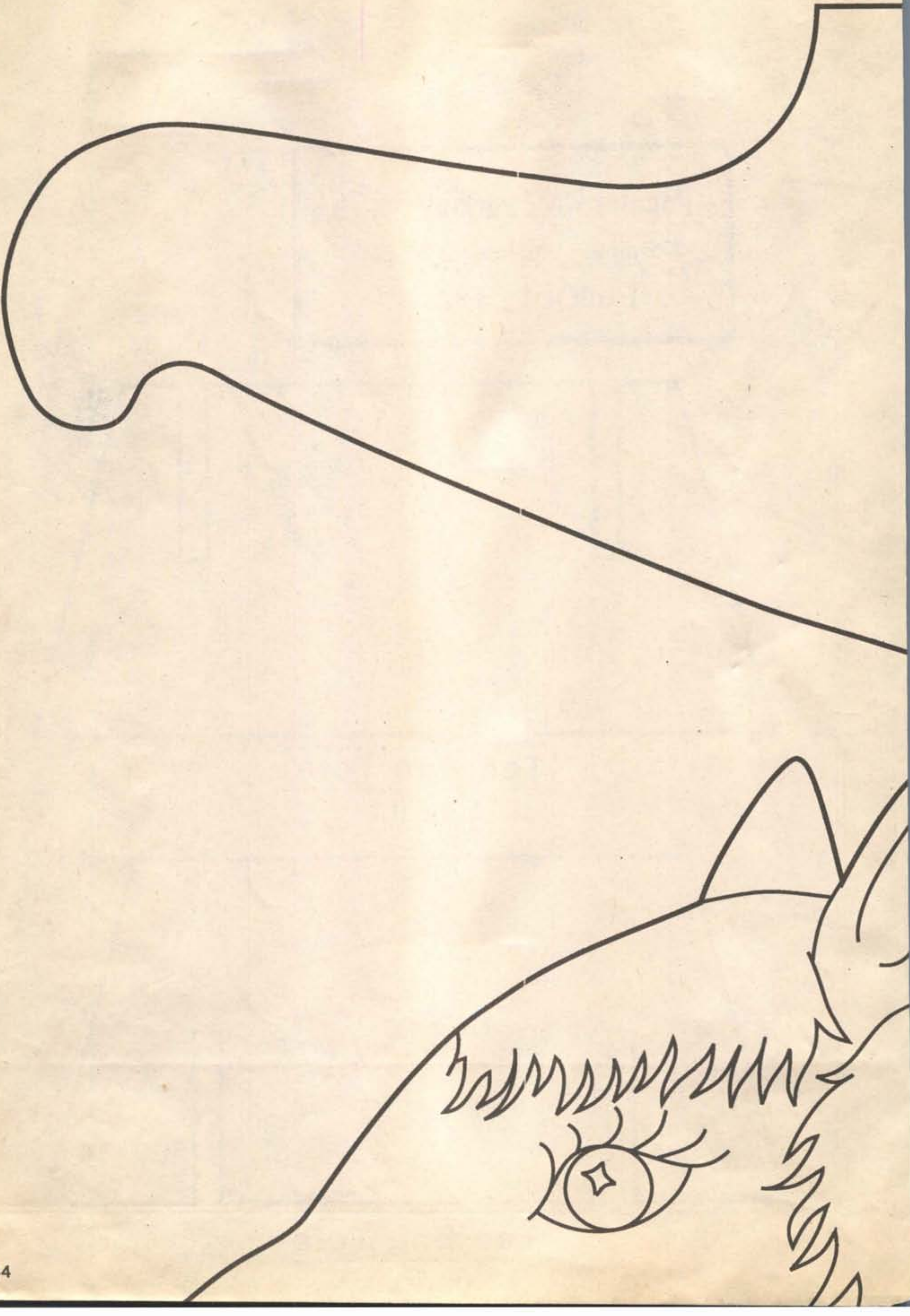

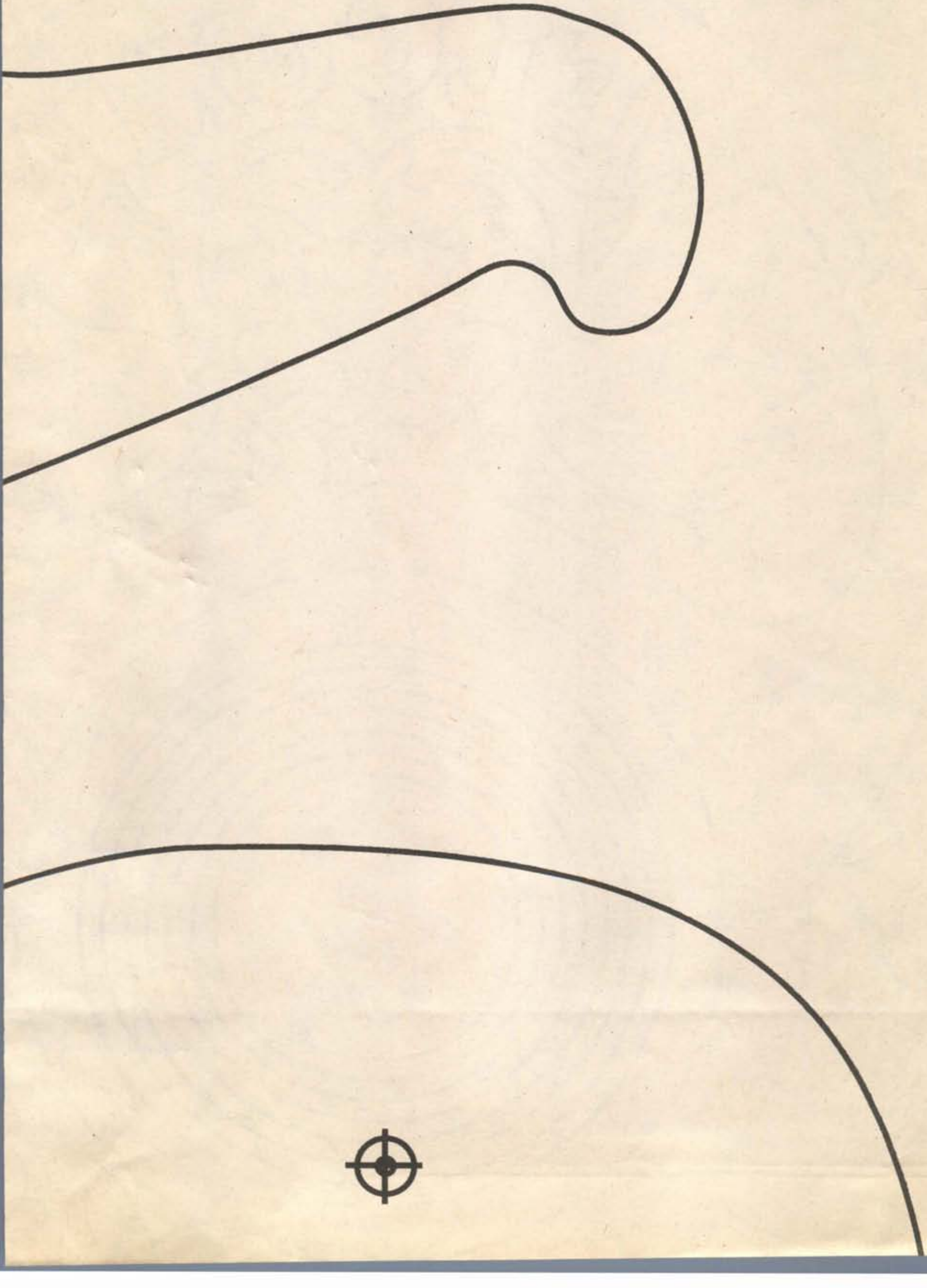

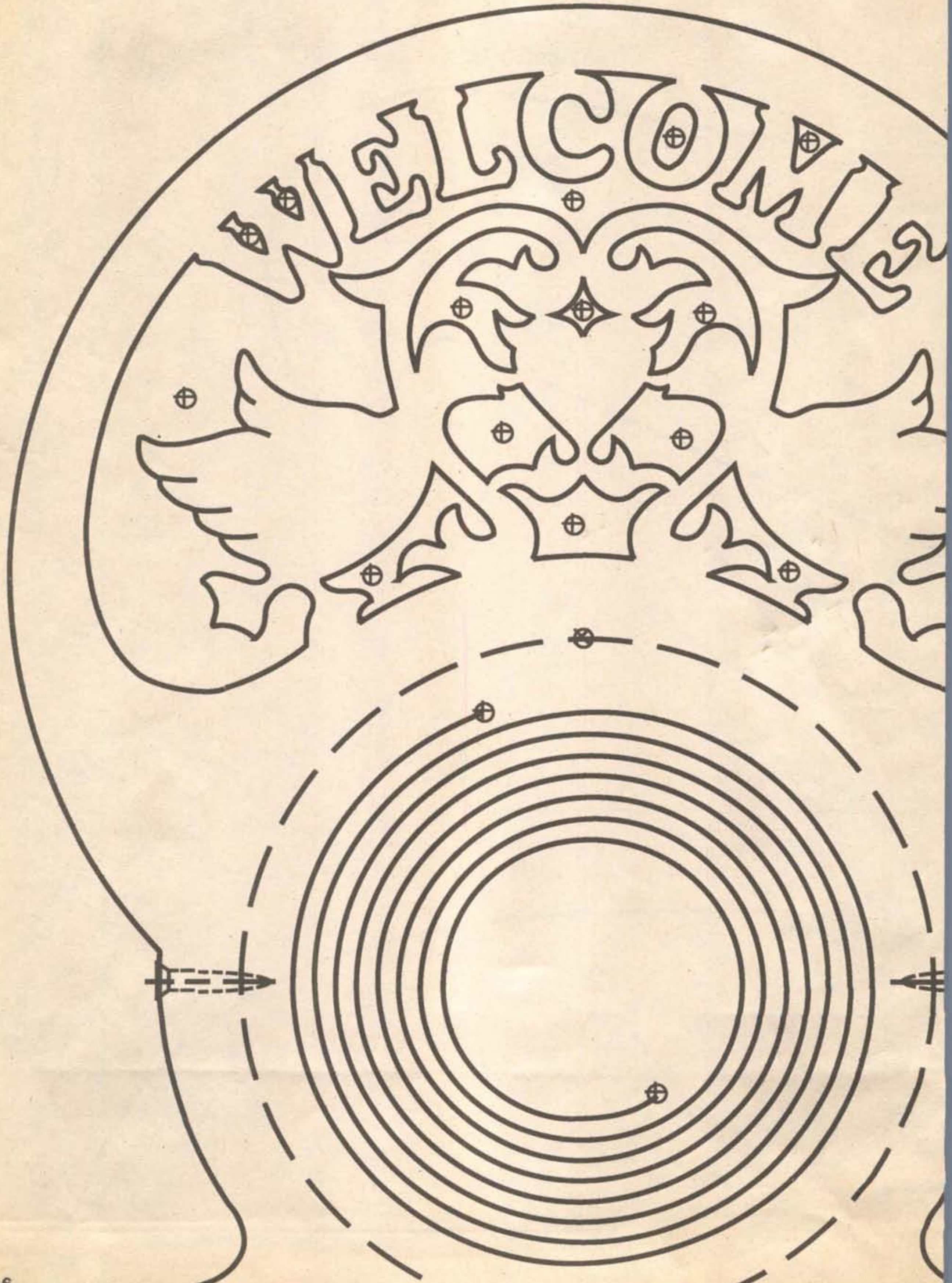
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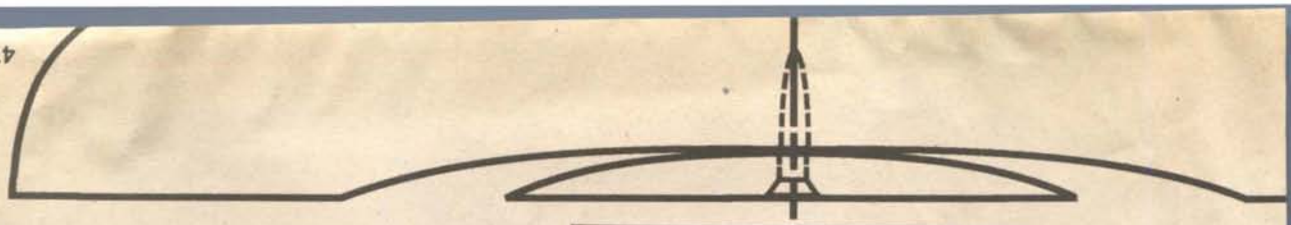

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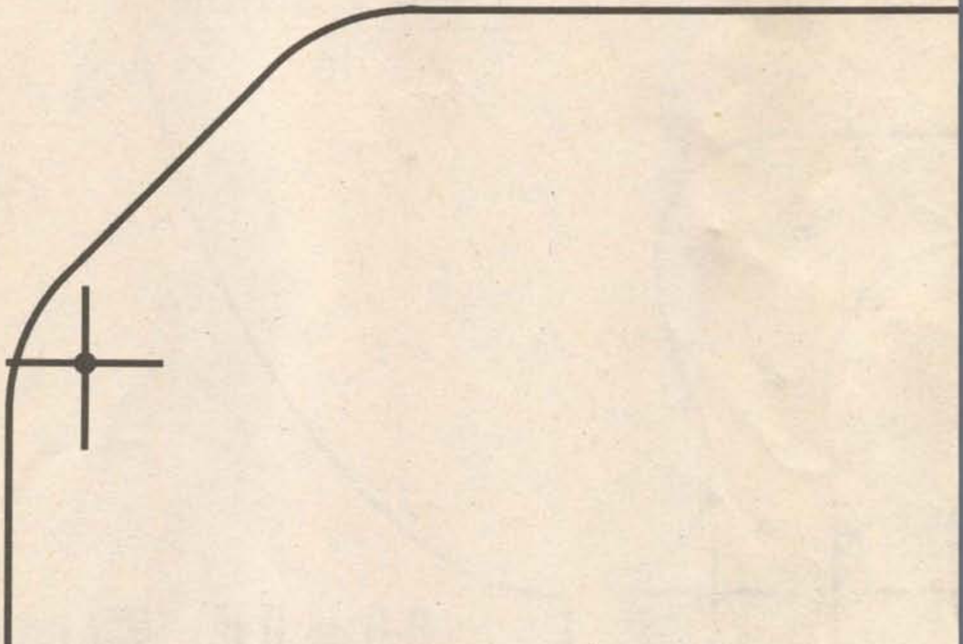

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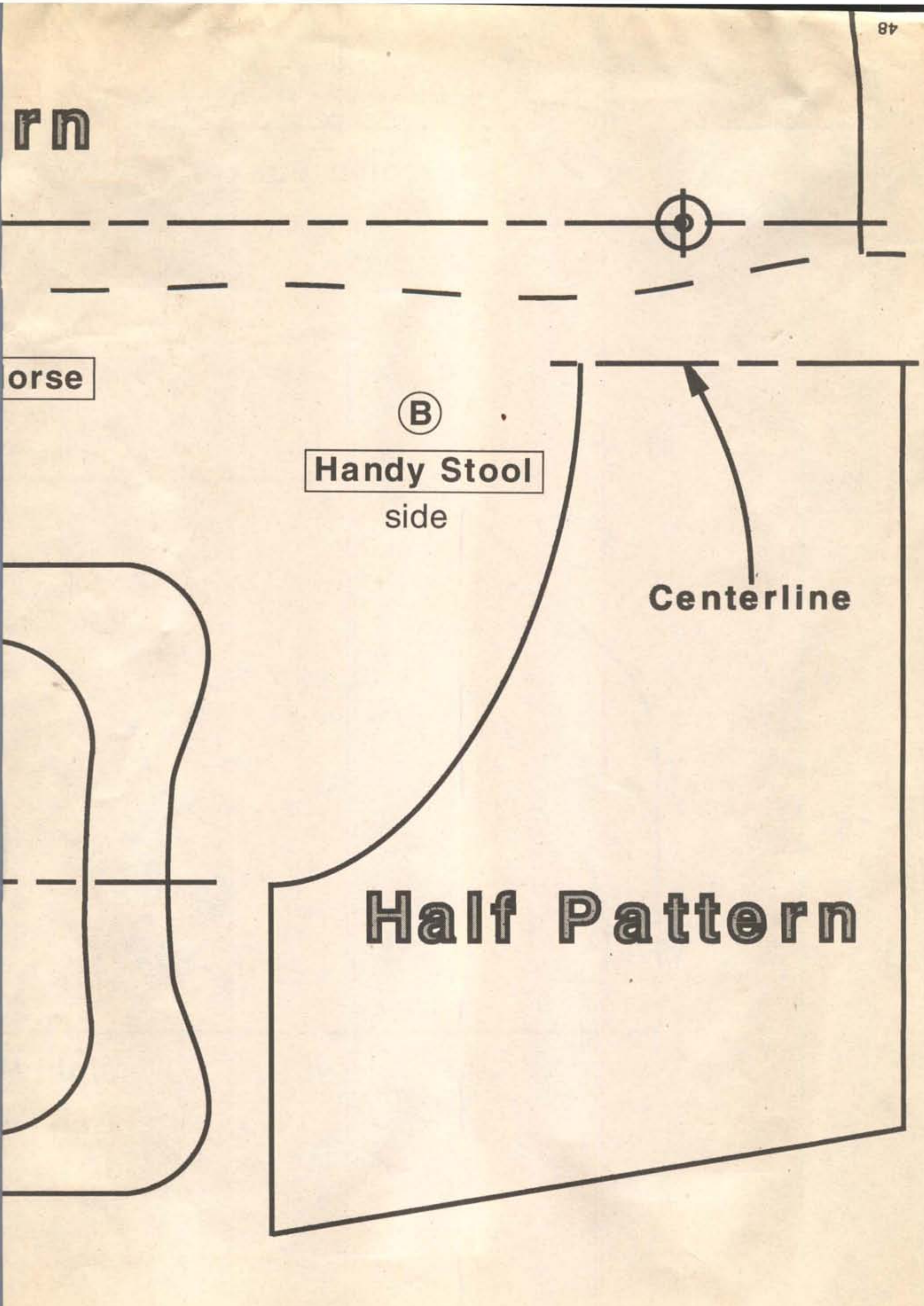
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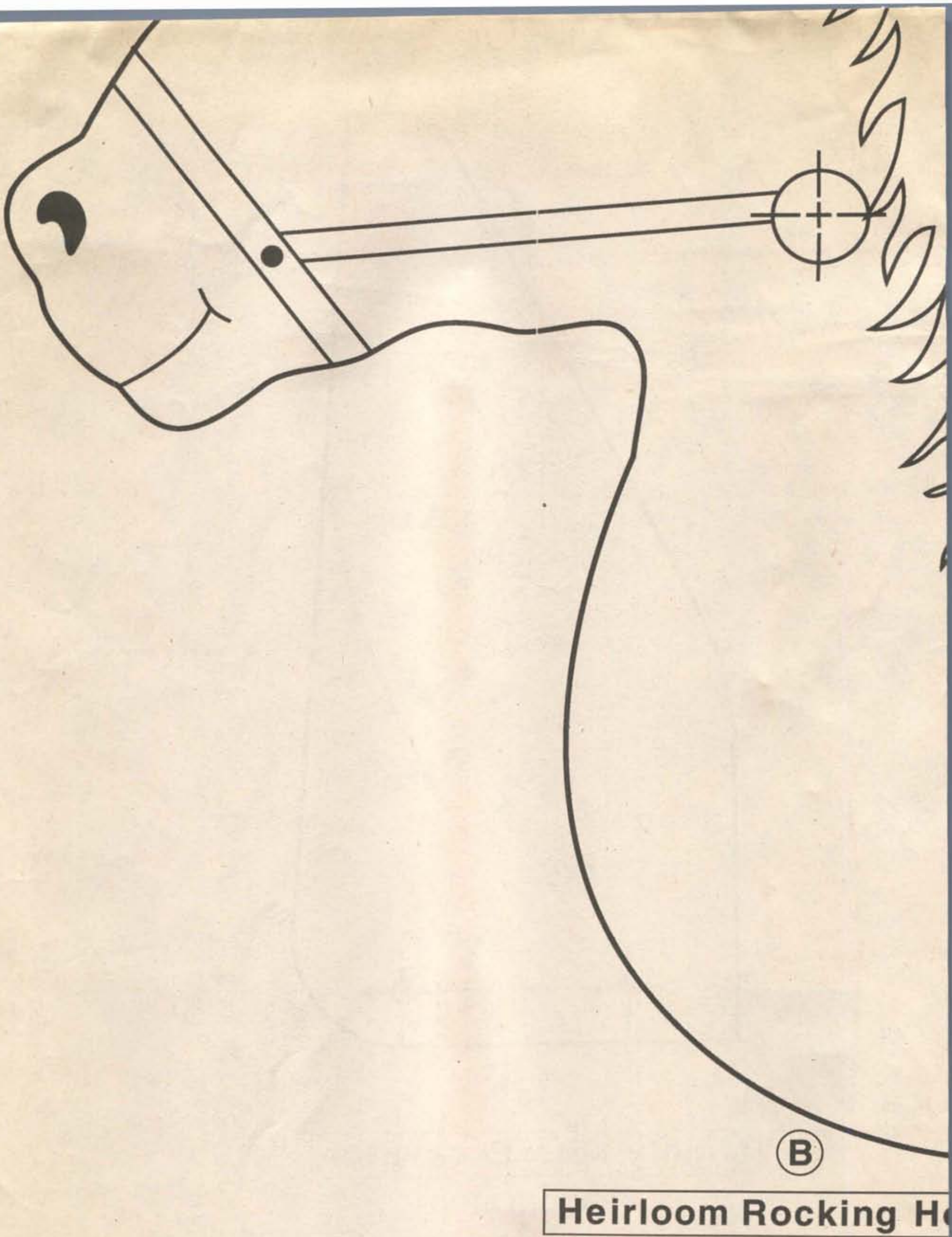
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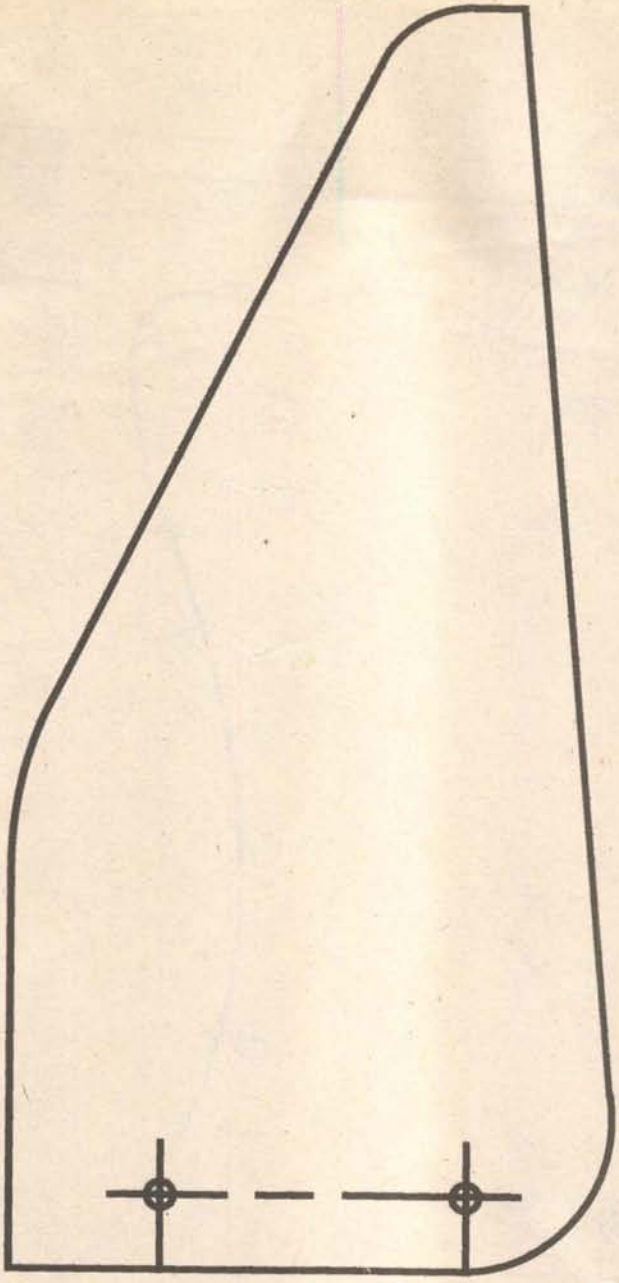

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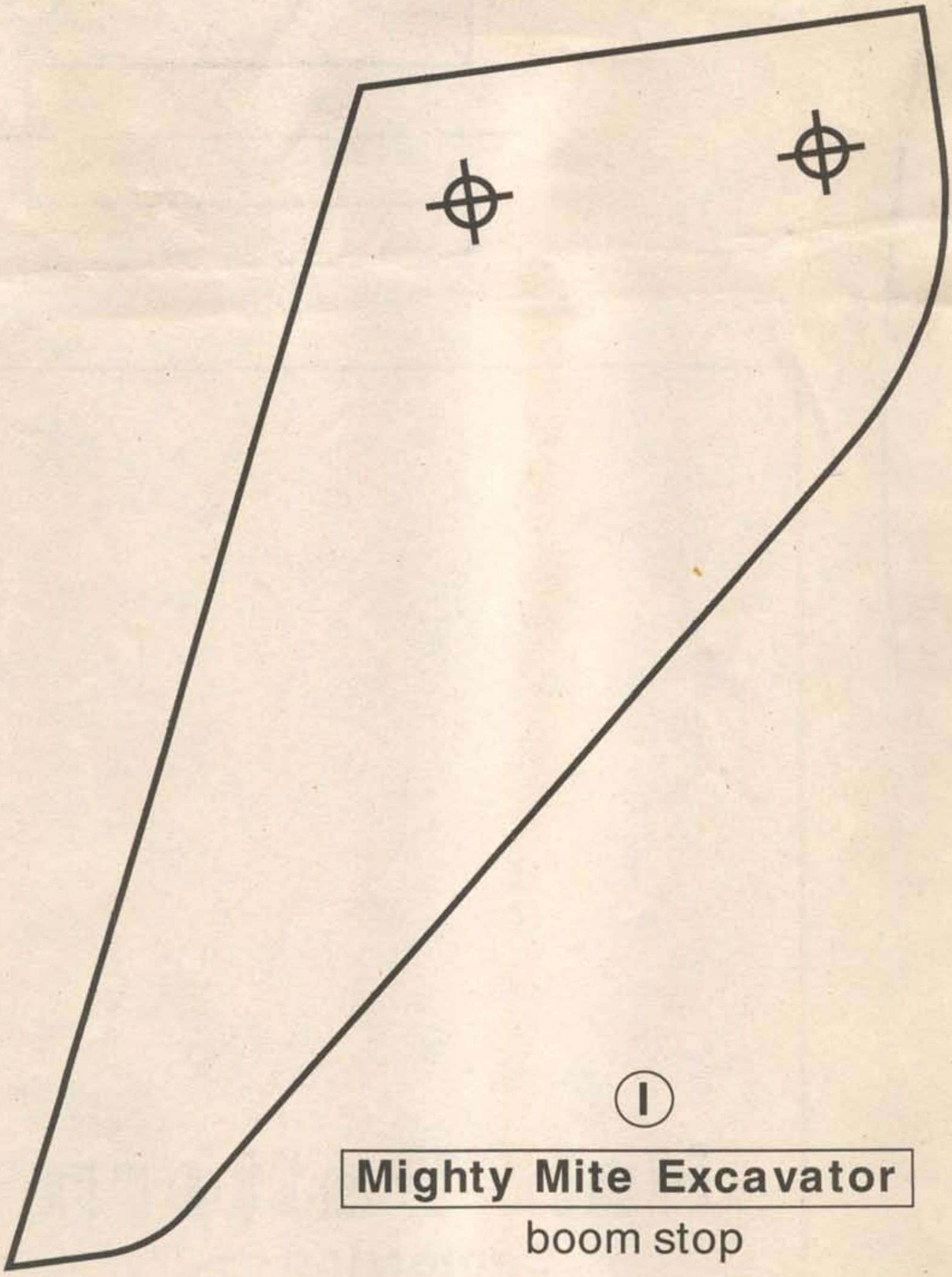

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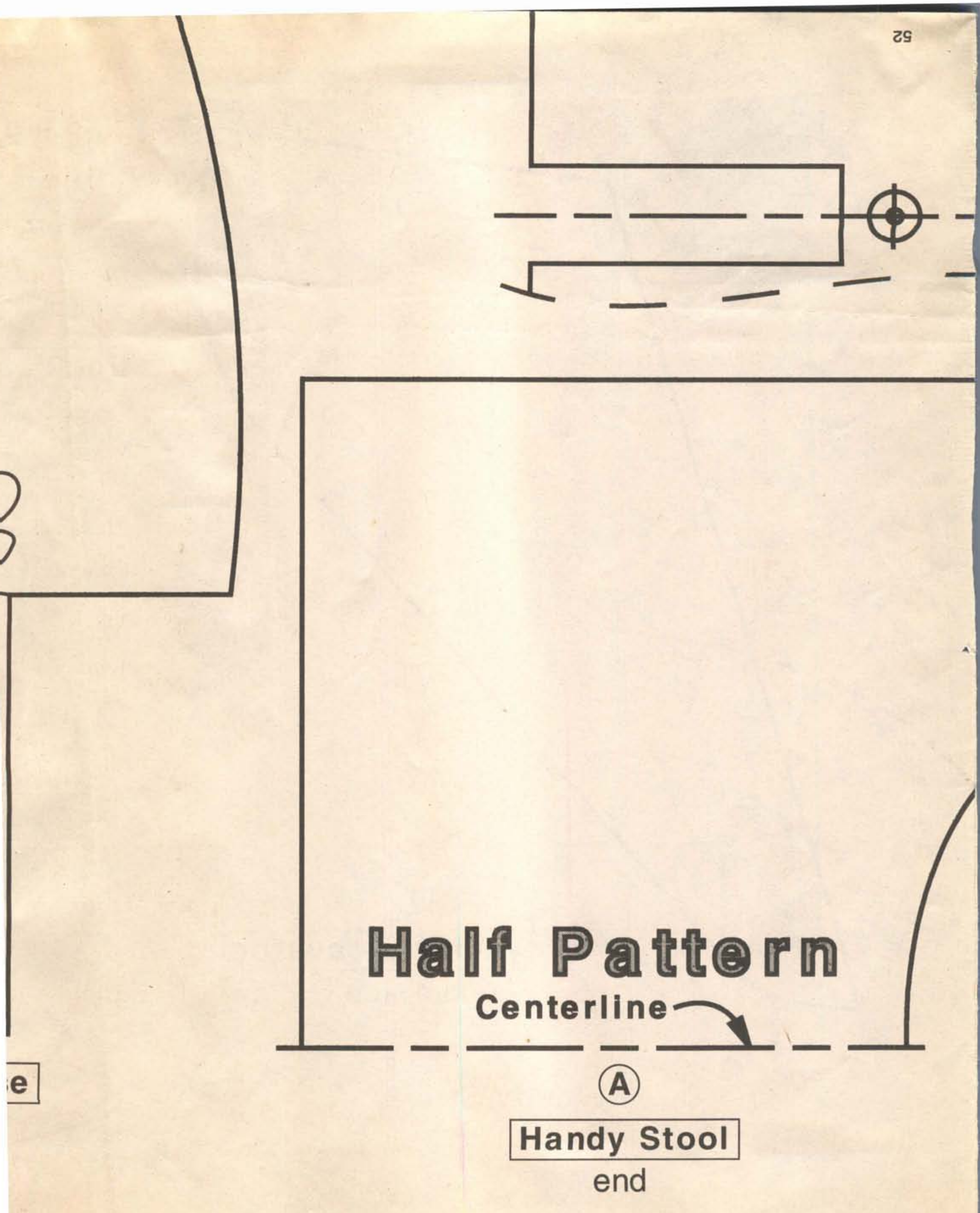
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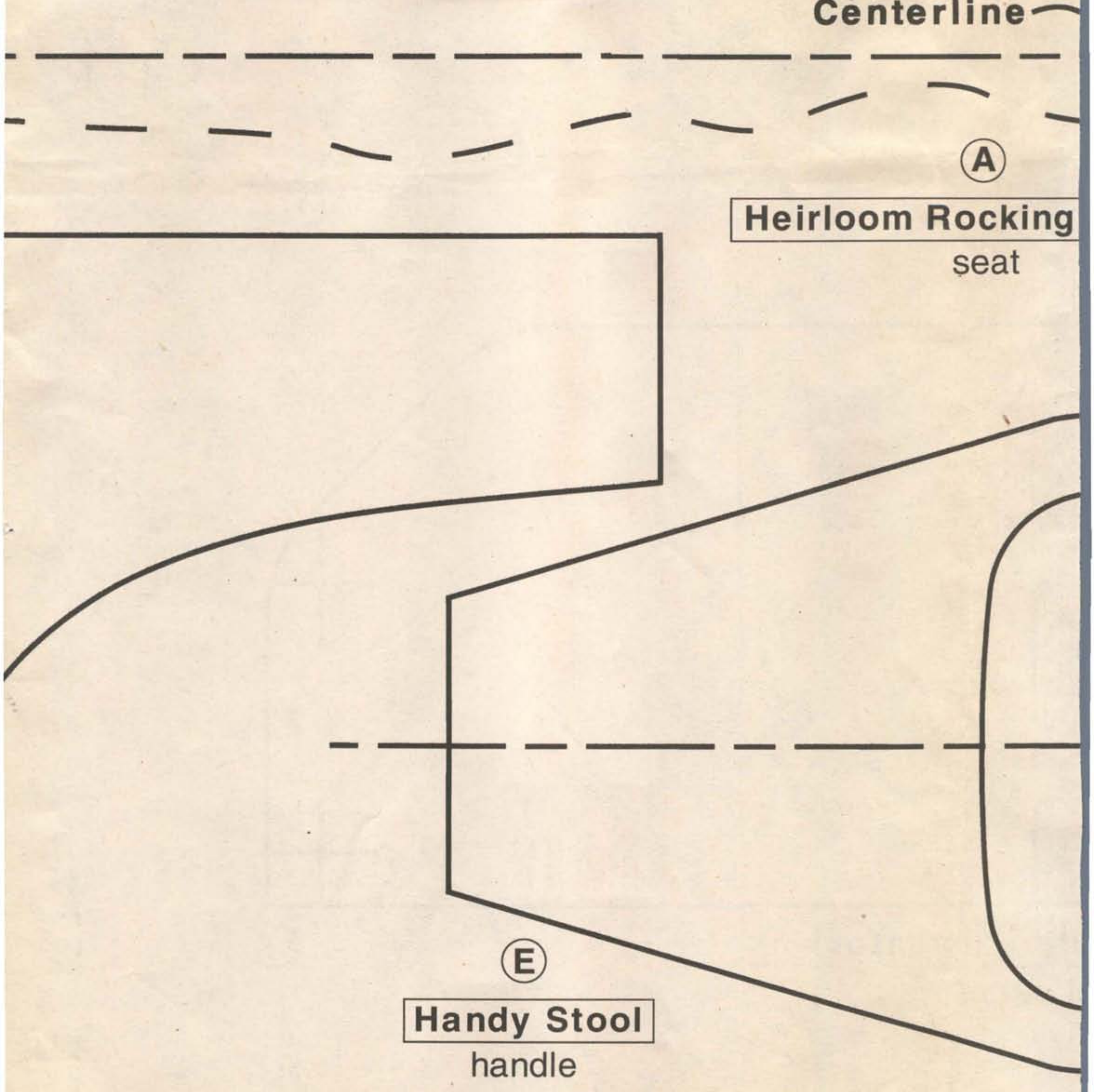

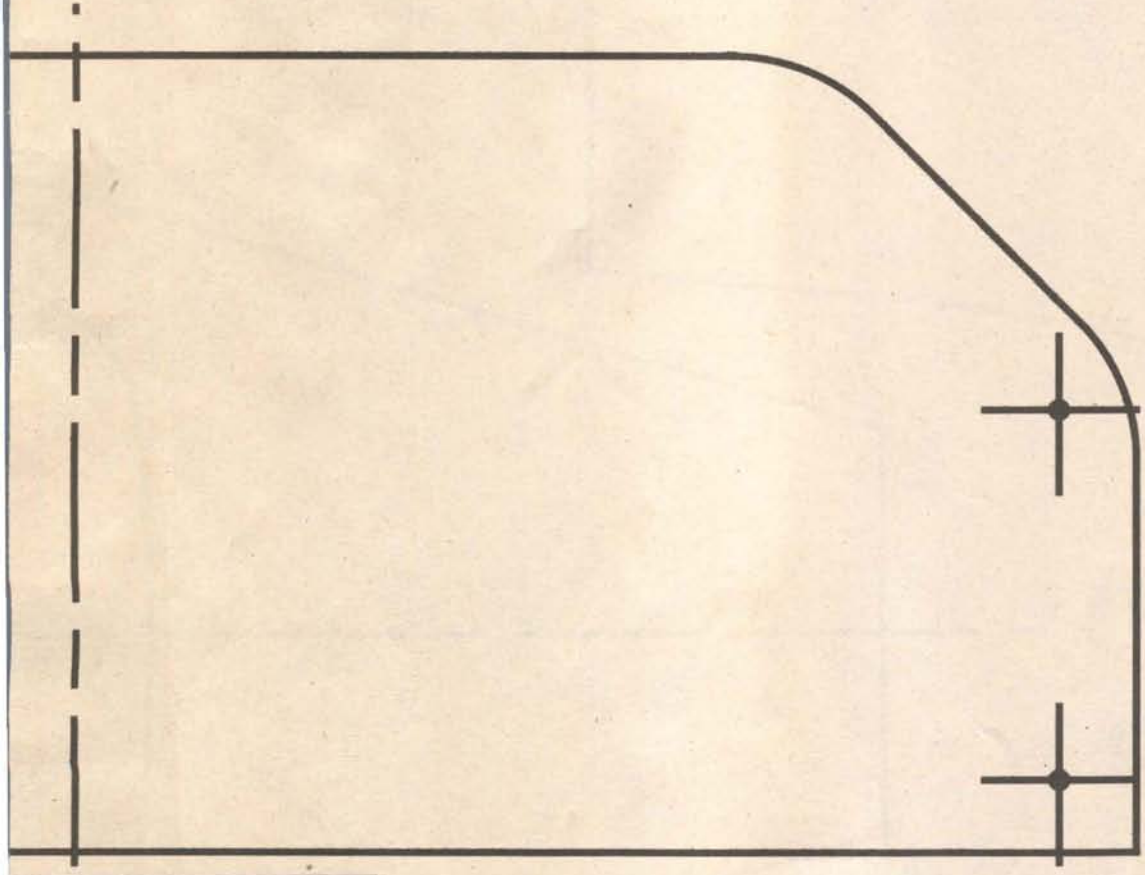

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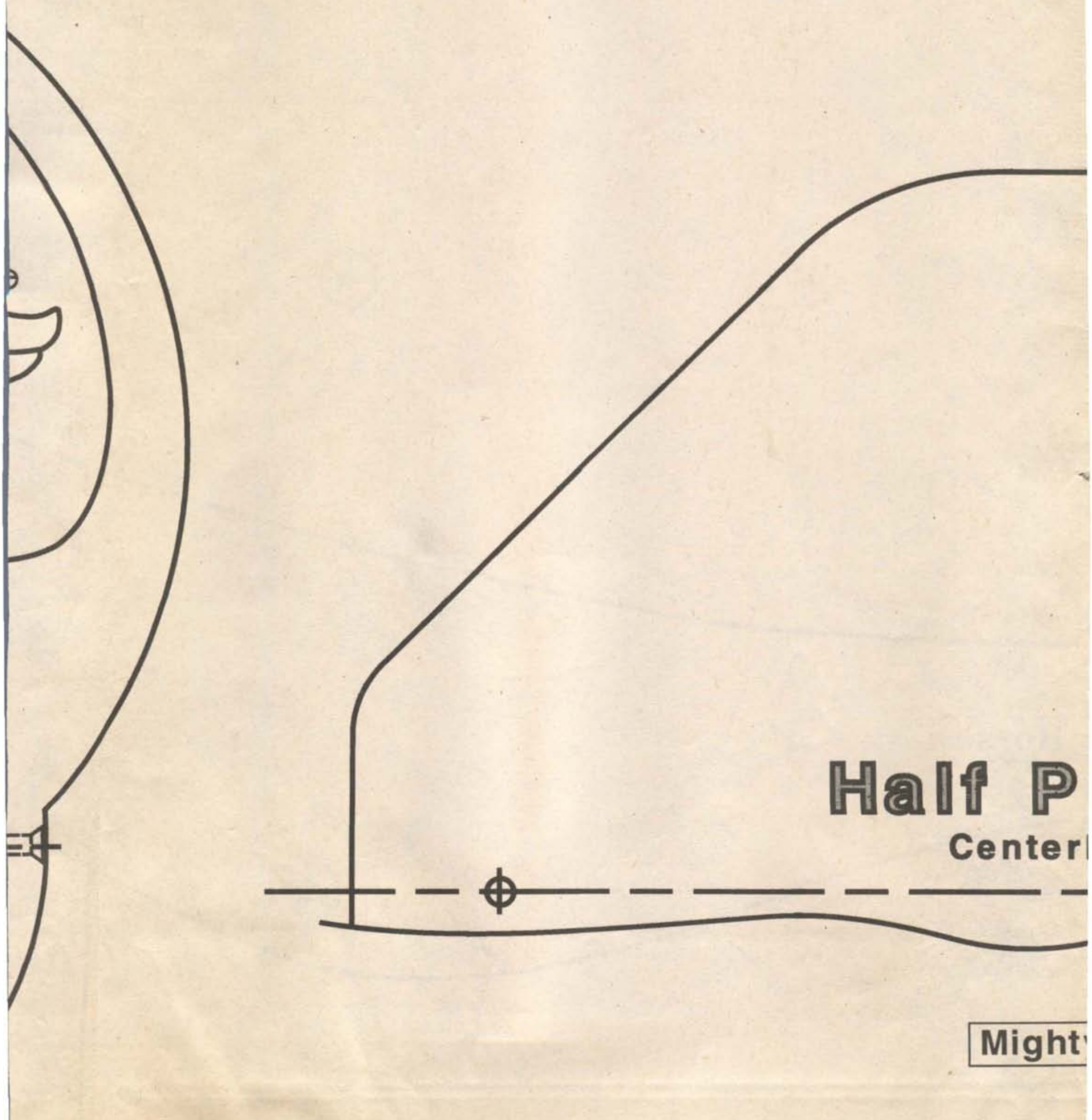
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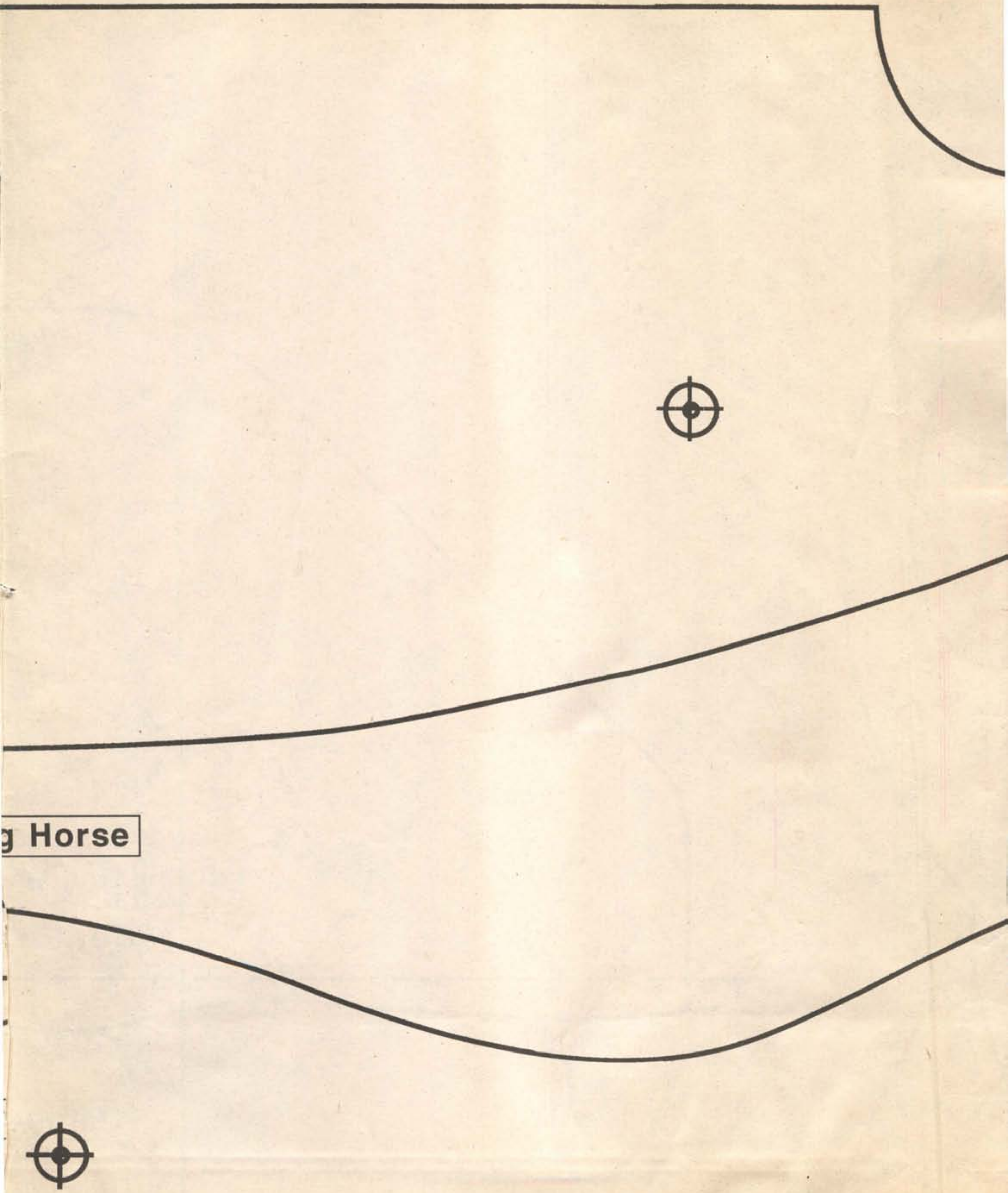
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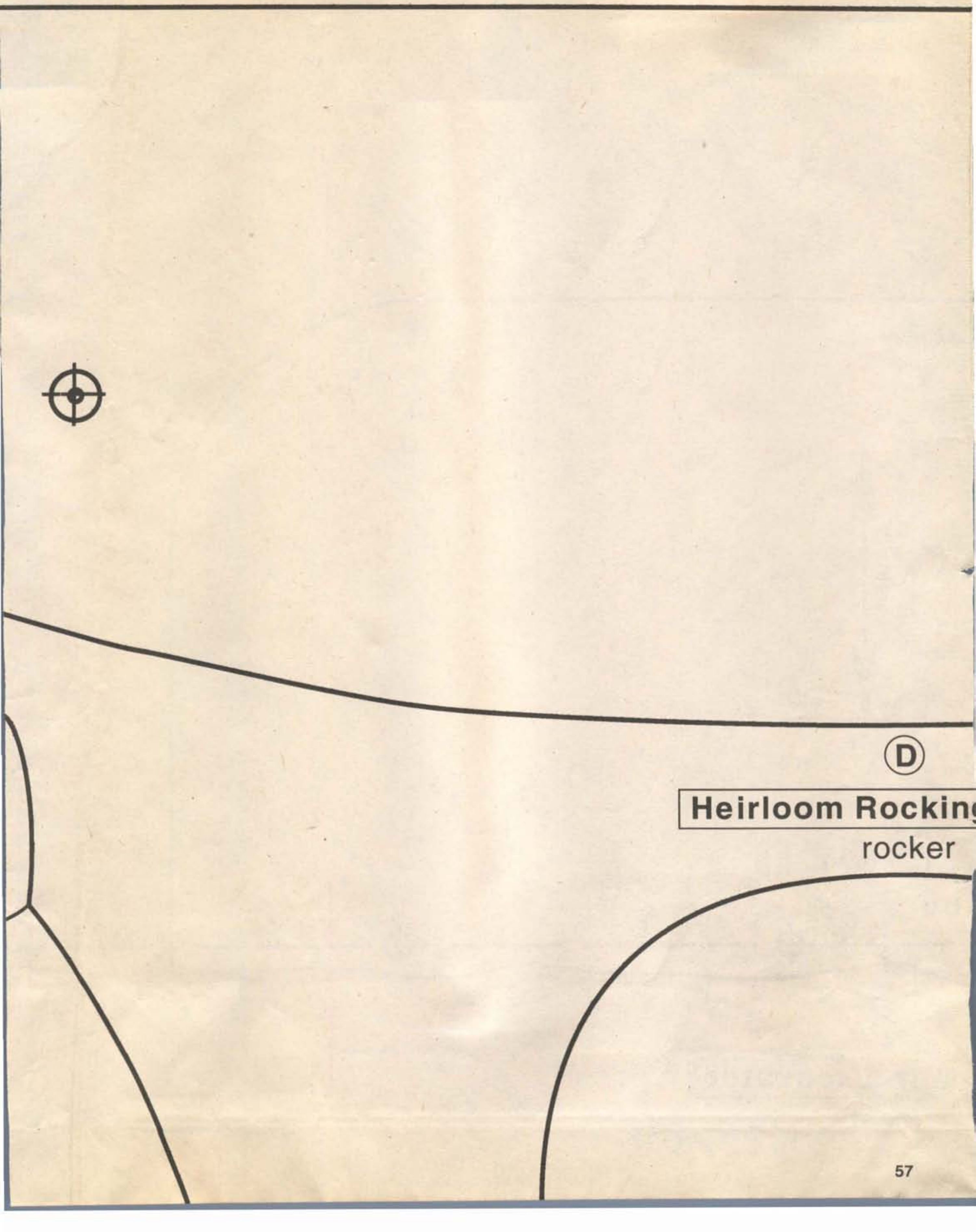
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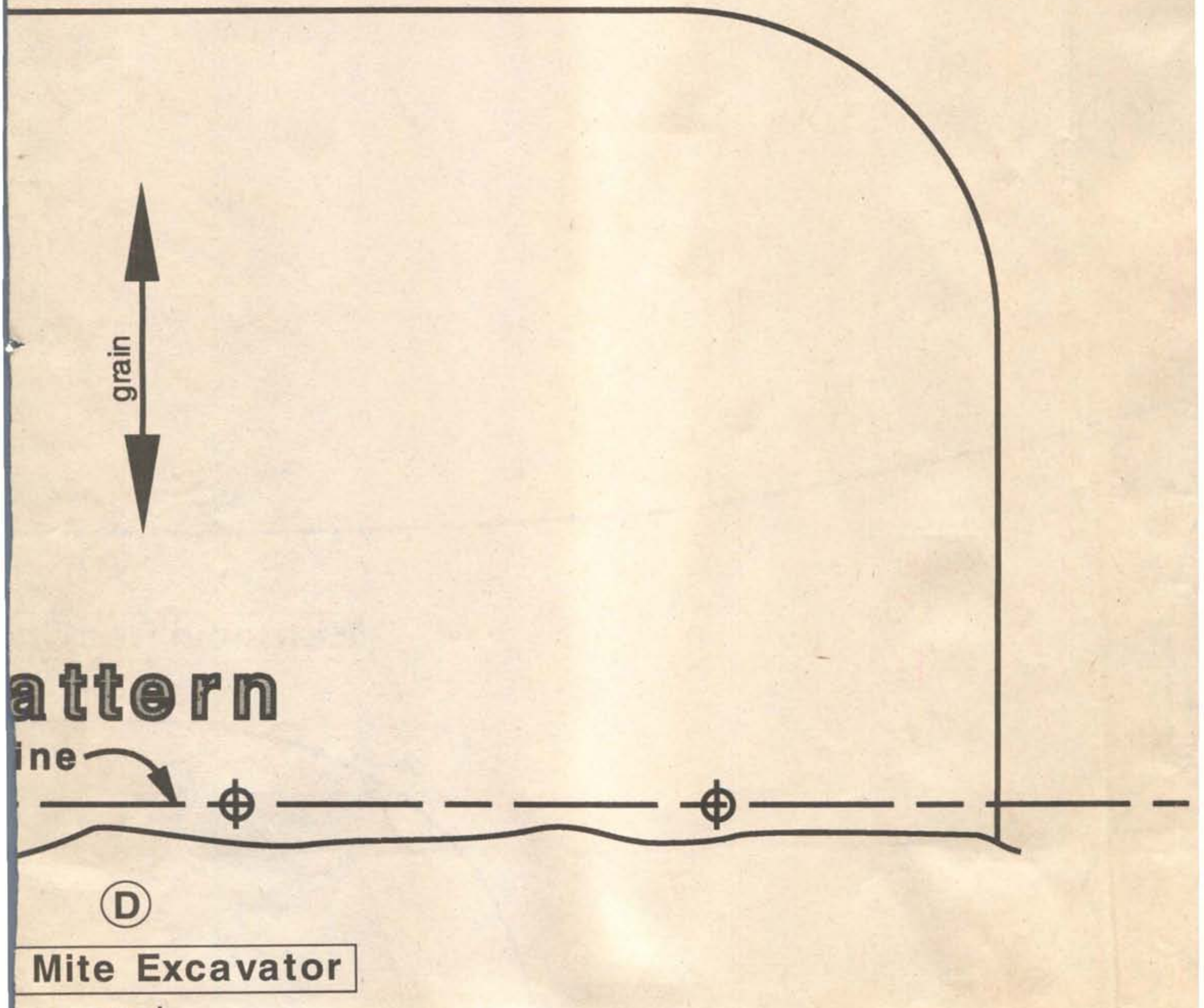
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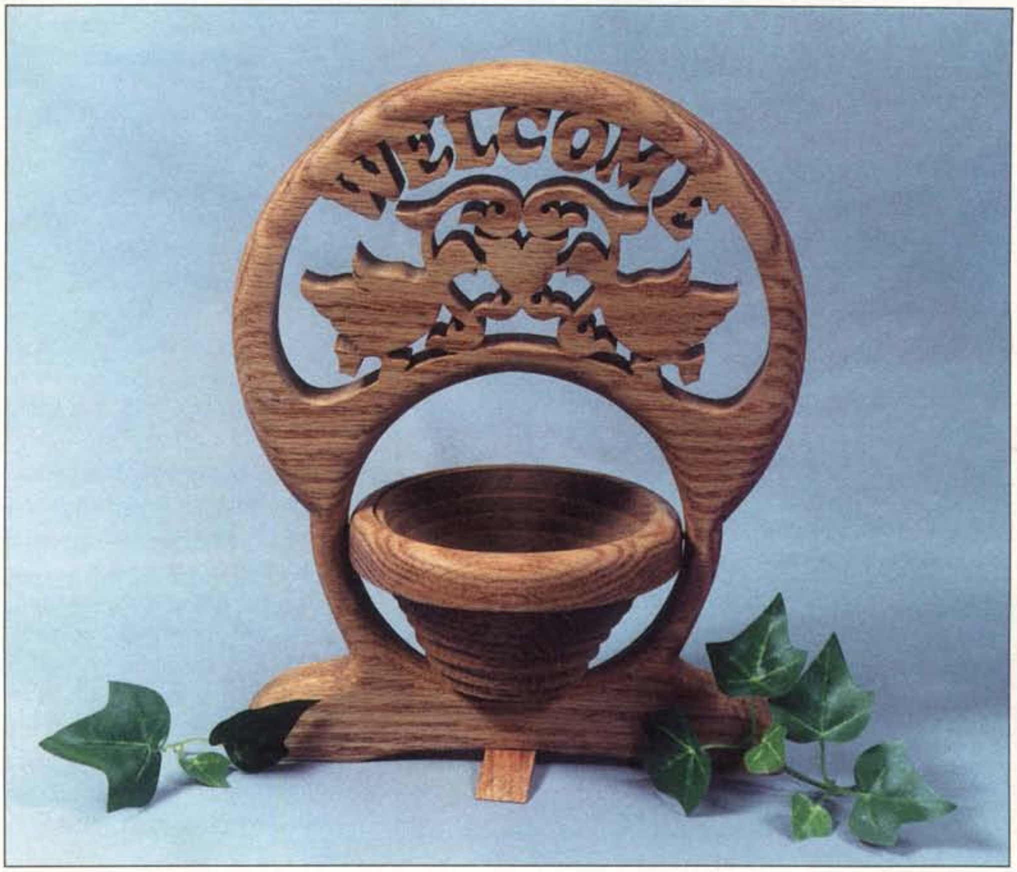
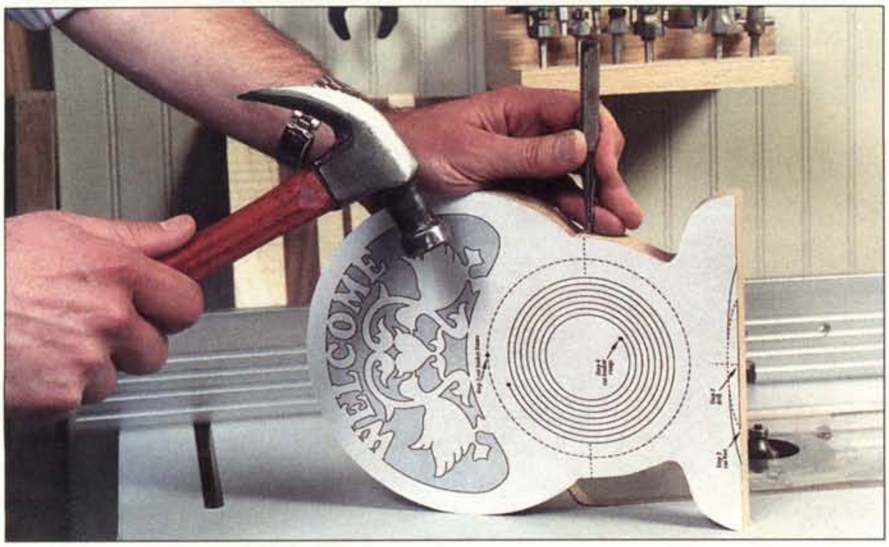


Welcome Basket

by Rick Longabaugh

Select your work piece from any ¾" thick domestic hardwood. Make sure it's free from any defects such as knots and splits. I chose red oak for this charming project. Mahogany, walnut or cherry are generally easier to cut and would make a beautiful project as well.

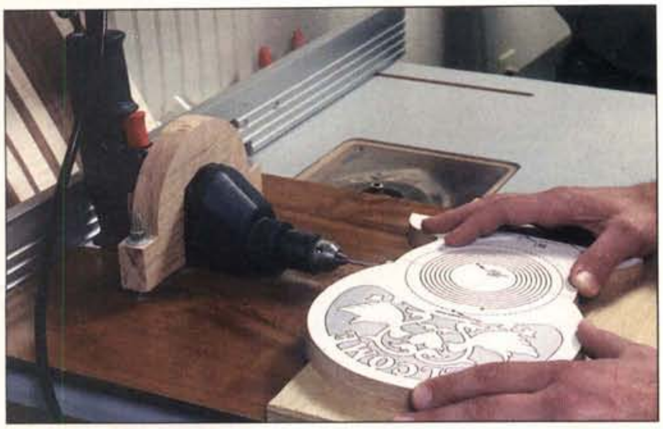
Use a hammer and center punch to mark the drill points where the basket and foot will pivot.



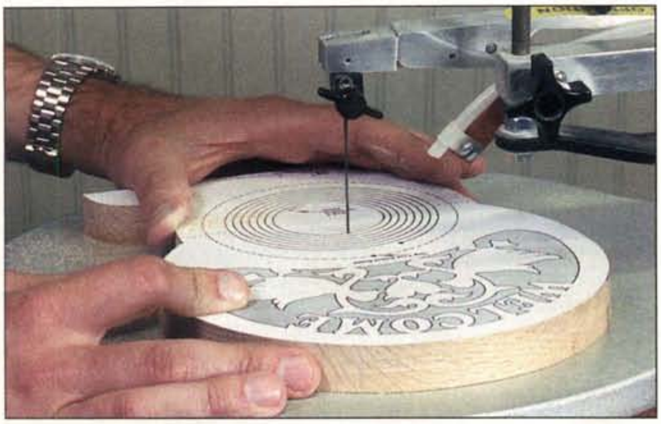
Cut your blank 8¼" wide by 10½" high. Sand the surfaces of the blank with 80–grit sandpaper, then 120–grit and finish with 220–grit. Clean the dust from the surfaces, copy the pattern from the PullOut™ Plans and adhere the pattern to the work piece with a repositionable spray adhesive such as 3M Spra–Mount™.

Check that the saw table is set at 90° to the blade. Use a #9 scroll saw blade and cut the outer shape of the pattern. Drill the basket and foot pivot points ¾" deep at the locations shown in the PullOut™ Plans. Place a piece of masking tape on a ⅛" drill bit to mark the depth of cut. Drill starter holes for the blade at the points shown in the pattern with a ⅛" drill bit.

To cut the basket rungs, tilt your table 5° down on the left side. Use a #9 scroll saw blade with the following specifications: .053 width, .018 thick-



Use a jig for accurate horizontal drilling.



Cut the pattern for the basket rungs. Use spray adhesive to secure the pattern to your stock.

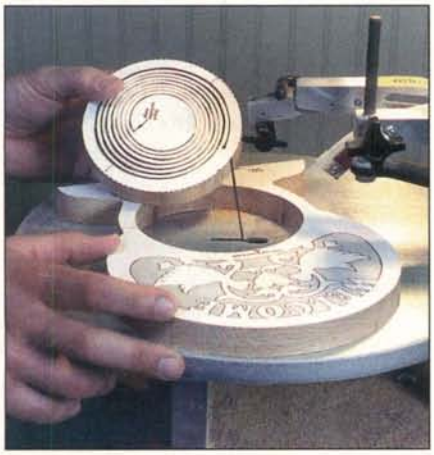
ness, and 11½ teeth per inch. (See the HELPFUL HINTS side bar.) Begin cutting the rung spiral from the center, cutting clockwise until you reach the end of the spiral.

Level the table and cut out the circle to separate the basket from the outer shape. Set the basket aside.

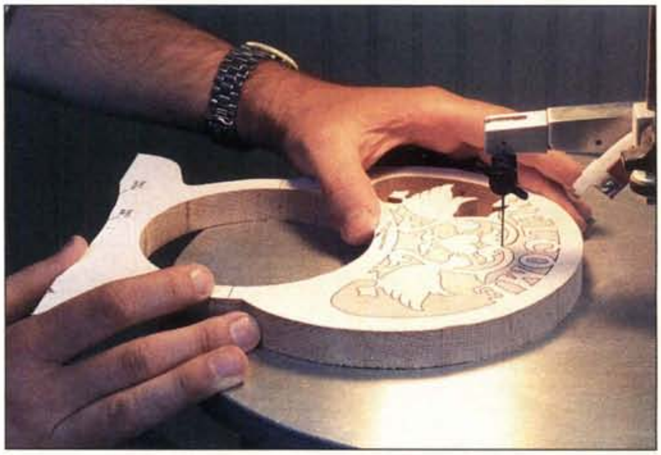
Cut the foot from the outer shape and cut out the design inside the outer shape. Sand all the cut edges with 220–grit paper.

Use a 1/4" roundover bit in your router to shape the front edge of the basket frame, the opening for the basket and the top edge of the basket. Countersink the basket and foot pivot holes for #6 flat head wood screws. Attach the foot and basket with #6 X 3/4" FH screws.

Apply a penetrating oil finish such as Watco, Min-Wax, or Formby's Tung Oil. To apply the oil evenly, select a pan large enough to lay the basket in; pour the oil into the pan, and soak the basket for 20–30 seconds. Continue the finishing procedure according to manufacturer's instructions. PW



Separate the basket from the outer shape.



Cut the top design on a level saw table.

Sand to remove the roughness caused by cutting out the design.

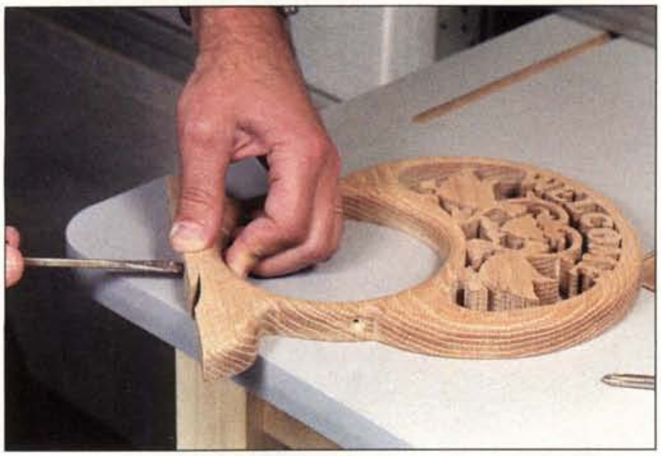
Ease the edges with a 1/4" roundover bit.

HELPFUL HINTS:

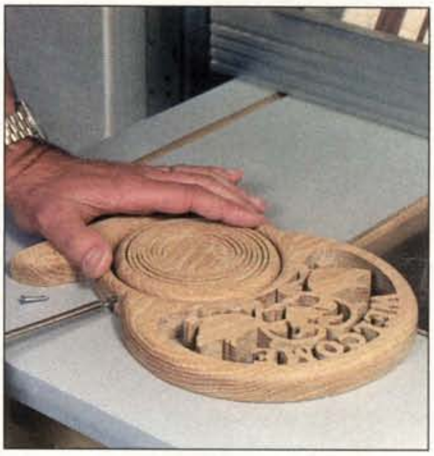
Different brands of scroll saw blades will vary in thickness. The width of the saw kerf will affect how deep the basket folds out. If your brand of #9 blades doesn't allow the basket to fold out deep enough with the table set at 5°, try changing the table angle to 4° or 3°.

Some scroll saws don't have accurate angle gauges, therefore, I suggest you make a test cut of the basket rungs on a piece of scrap wood. This will enable you to test if the basket will fold out properly. If the basket does not fold out deep enough, try decreasing the angle, or increase the angle if it folds out too far.

Occasionally the basket won't fold out completely. Due to the complexity of the grain patterns in some woods, the basket will turn so that the grain does not align after you have cut the basket rungs. If so, simply realign the grain by turning the basket rungs clockwise; then open the basket.

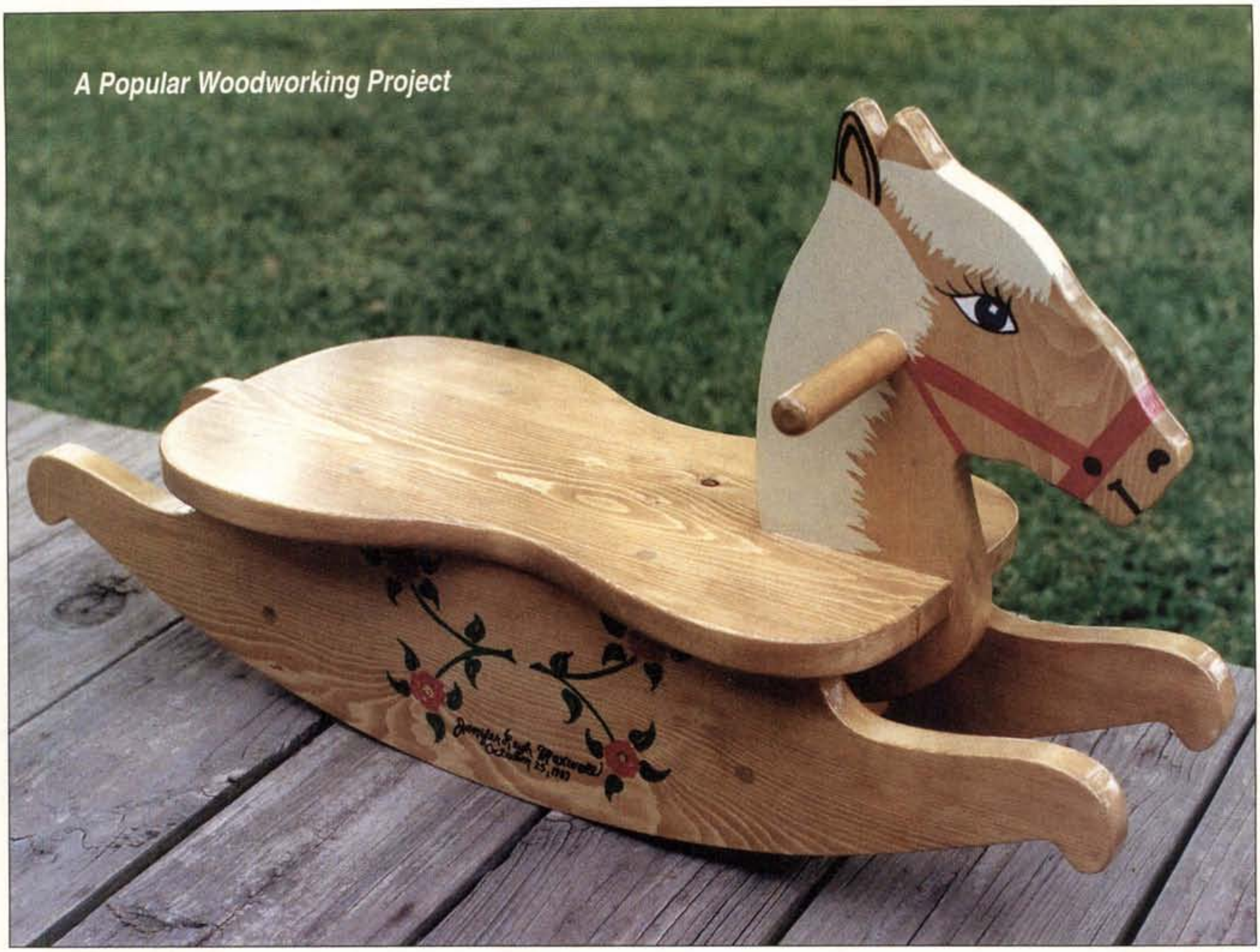


Assemble the foot with a #6 FH wood screw.



Assemble the basket with two countersunk wood screws.

Just a few of the quality products available in pattern form from "The Berry Basket."



A Popular Woodworking Project

HEIRLOOM ROCKING HORSE

by Robert L. Elmore

Today, many children's toys are made of plastic. Not many survive the rough and tumble play of pre–schoolers and even fewer get better with age. Well–made wooden toys, on the other hand, are a notable exception and this little rocking horse is a perfect example.

Easily made and strongly built, it can become a storehouse of treasured childhood memories as it's passed down to each new generation. I enjoy making them for friends and family members when each new child comes along. Each rocking horse is unique with the newborn's name and date of birth stenciled on the side. In the past several years, I've probably made more than fifty of them and they're scattered across the U.S. and abroad.

Almost any wood can be used for construction. My personal preference is clear pine for a warm and soft appearance. Pick out a piece of close–grained and knot free stock. Align the patterns with the recommended grain direction to obtain maximum strength and prevent splitting of the pieces.

Transfer the patterns from the Pull Out™ Plans to your stock and bandsaw the parts to shape. Cut the notch in the seat (A) for the head (B) slightly narrow to allow for a firm, press fit when inserted. Drill and counterbore the pilot holes for the screws where indicated on the rockers (D) and the seat (A)—there are two on each rocker; seven on the seat. Drill one pilot hole in the front cross–brace, for mounting the head, as shown on the pattern. Counterbore them ¼" deep for ⅜" hardwood dowel plugs. Don't counterbore the two pilot holes for attaching the head. Drill a ⅝" hole in the head piece (B) to accept the 7¾" long hardwood dowel handle.

Sand away any saw marks. Start with 150–grit sandpaper and work down to 220–grit for a perfectly smooth surface on all the parts. Round over the top and bottom edges in the leg areas of the seat (A) as shown on the patterns. A ¾" strip torn from an old sanding belt works perfectly for this detail. Round over the points of the ears on the head piece (B) for safety reasons. Check all parts to make certain that all edges are softened and smooth.

Layout and mark the locations of the cross–braces (C) on the rockers—note the proper grain direction. Apply a thin

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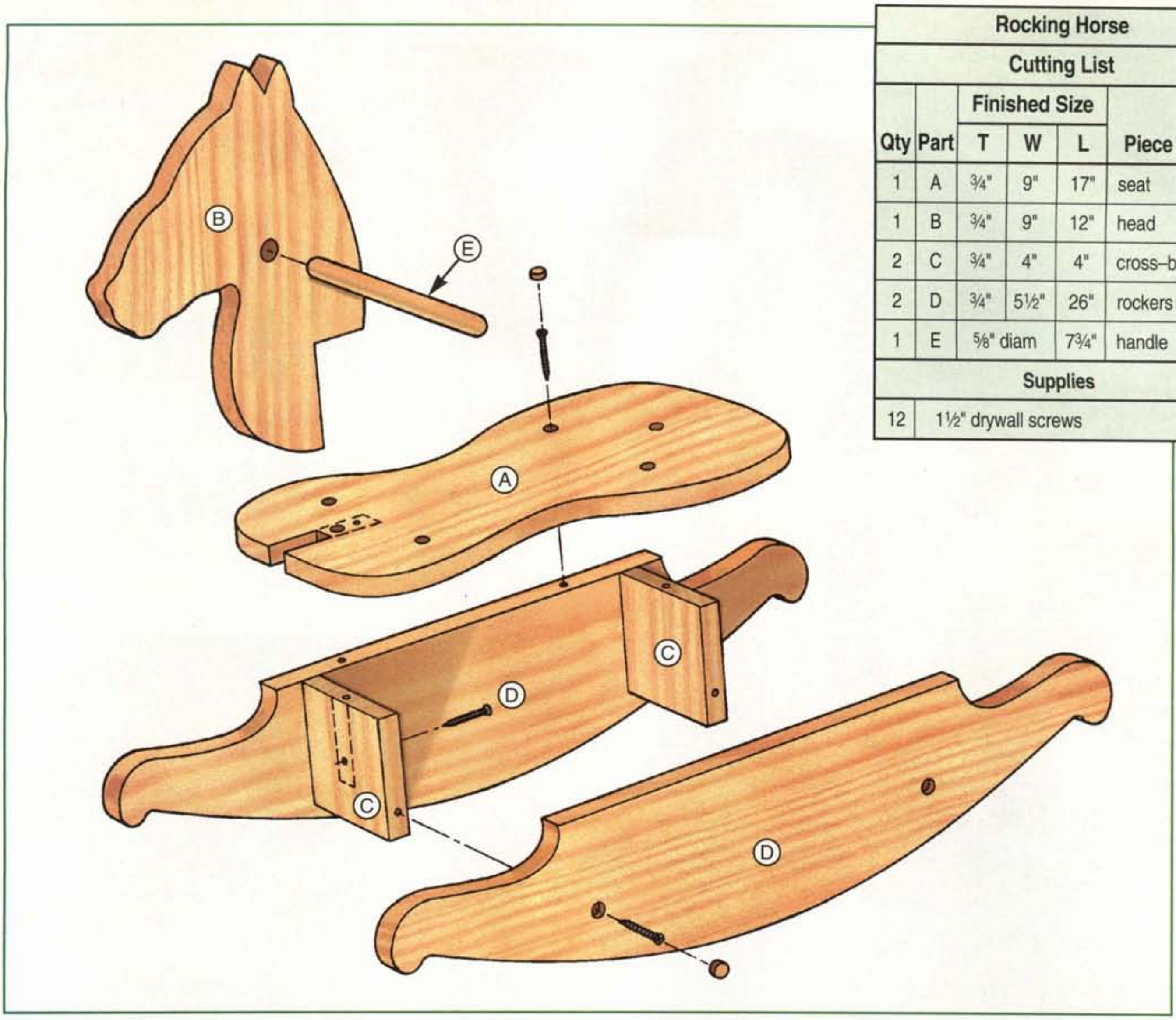
***Robert Elmore** is a dedicated woodworker and freelance writer from Richmond Hill, Georgia.*



Rocking Horse

Cutting List

Qty	Part	Finished Size T	W	L	Piece
1	A	¾"	9"	17"	seat
1	B	¾"	9"	12"	head
2	C	¾"	4"	4"	cross–braces
2	D	¾"	5½"	26"	rockers
1	E	⅝" diam		7¾"	handle
Supplies					
12	1½" drywall screws				

coat of glue to the cross–braces and attach them to the rockers (D) with 1½" drywall screws. Check with a combination square for proper alignment. The front cross–brace must be 90° to the top edge of the rockers. Glue in the ⅜" plugs and wipe off any excess glue with a damp cloth. When this assembly is dry, sand the plugs flush with the surface of the rockers.

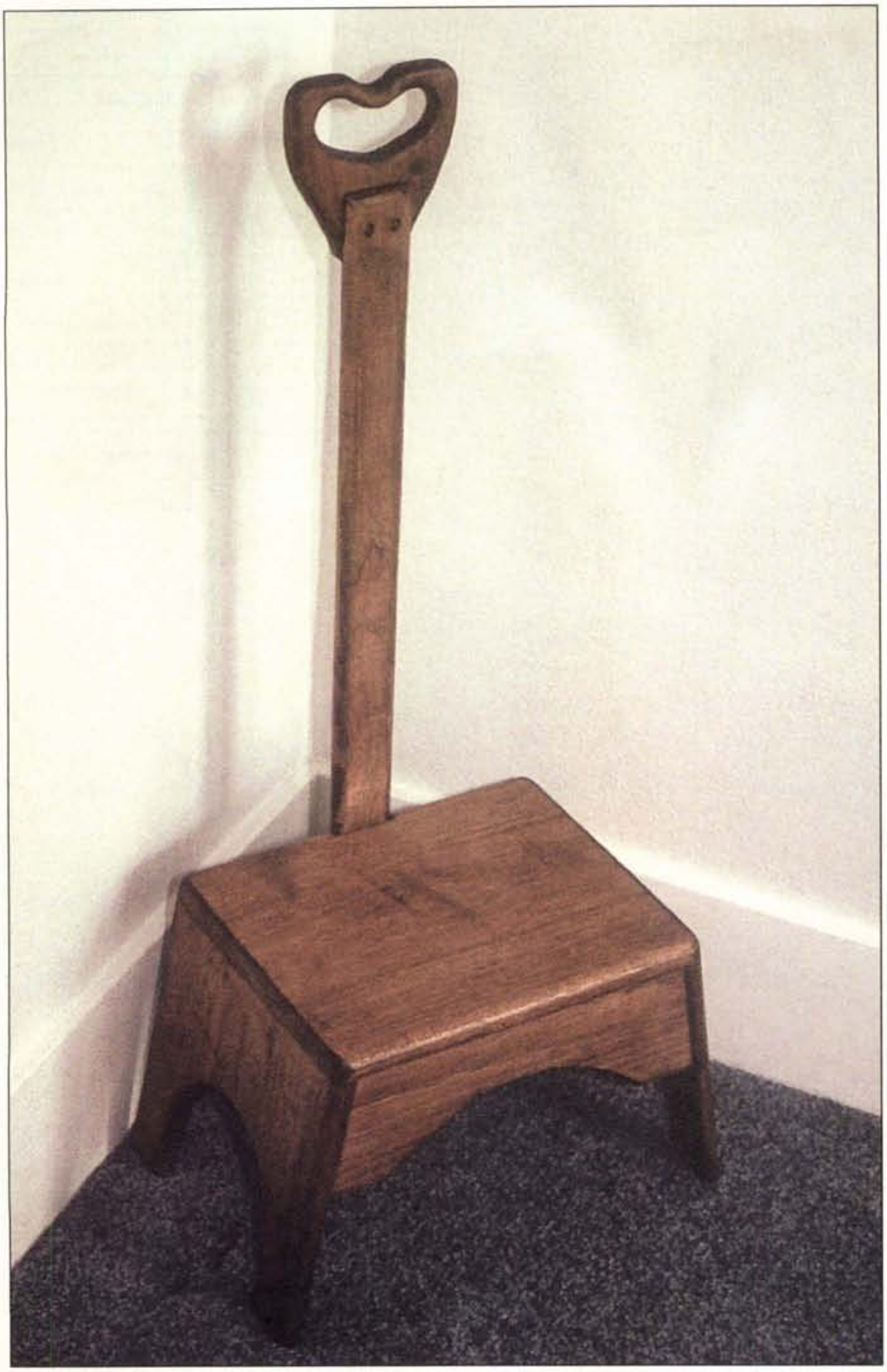
Lay the seat, bottom side up, on a soft surface to avoid scratching the upper side. Place the assembled rockers on the seat so that the front cross–brace is flush to the back of the head notch. Mark this position with a sharp pencil inside the four corners of the rocker assembly. Hold everything together with both hands and rotate them to the upright position. Insert a screw on each side just enough to prevent movement and recheck your alignment. If everything is still in the proper position, remove the seat and apply glue to the top edges of the rockers and cross–braces. Replace the seat in the correct position and drive the six holding screws into the mounting holes. Plug the holes and sand them flush when everything is dry.

Check the fit of the head (B) in the slot cut in the seat (A) and make any required adjustments at this time. Tap the ⅝" dowel handle (E) into position and place a small amount of glue on the dowel just before it reaches the final position in the head. Do not force the dowel into the hole. If the fit is too tight, sand the inside of the hole for a sliding fit. Check and make sure that it's centered.

Apply glue to the inside edges of the notch and the edges of the head piece. Push the head into position and secure it from underneath with one screw through the seat and one through the front cross–brace. Clean off any excess glue with a damp cloth. Sand all outside surfaces with 220–grit paper and look for any missed glue spots.

Wipe the entire assembly down with a tac–cloth and apply an even coat of stain to all surfaces following the manufacturer's directions. When dry, paint the horse by following the suggested decorating scheme shown on the patterns or one of your own choosing. Be sure to use a non–toxic paint that's safe for children's toys and furniture. After painting, apply two coats of waterbased polyurethane and three additional coats on all outside surfaces. Sand lightly with #0000 steel wool between coats.

Be sure to save your patterns. When this beautiful and useful toy is seen by your friends and relatives, it will certainly become a frequently repeated project in your shop. PW



A Popular Woodworking Project

A Handy Stool

Cut the biscuit slots in the sides and ends long enough to accept 1½" biscuits.

by Hugh Foster

Here's a quick project that's sure to please people who need to reach high places regularly. This stool enables one to reach up without having to lean over and move the stool first. Building it is a snap. First collect the stock you will use—all pieces listed are nominally ¾" thick.

To make the ends (A), tilt your table saw blade to 10°. Cut to the dimensions given in the Cutting List so that the long sides are parallel at 10° off square. Transfer the end pattern from the PullOut™ Plans; then cut each curve in one continuous pass on the band saw. After cutting both ends, clamp them together and sand out the curves. Ease the inner and outer edges of the curve with a ¼" or ⅜" roundover bit in the router.

Cut the side pieces (B) with the same 10° angle on the top and bottom edges as dimensioned in the Cutting List. Saw a ⅜" deep single blade kerf ½" from the top of the side pieces for the top holddown clips. Transfer the side pattern from the PullOut™ Plans to the side pieces; then cut and sand as you did with the end pieces. Round over the edges with the same bit used previously. Sand all four pieces through 150–grit.

Biscuit–join the four base pieces together. One side should be joined ¾" inset from the edge of the end to leave room for the handle. Use countersunk screws and plugs to reinforce

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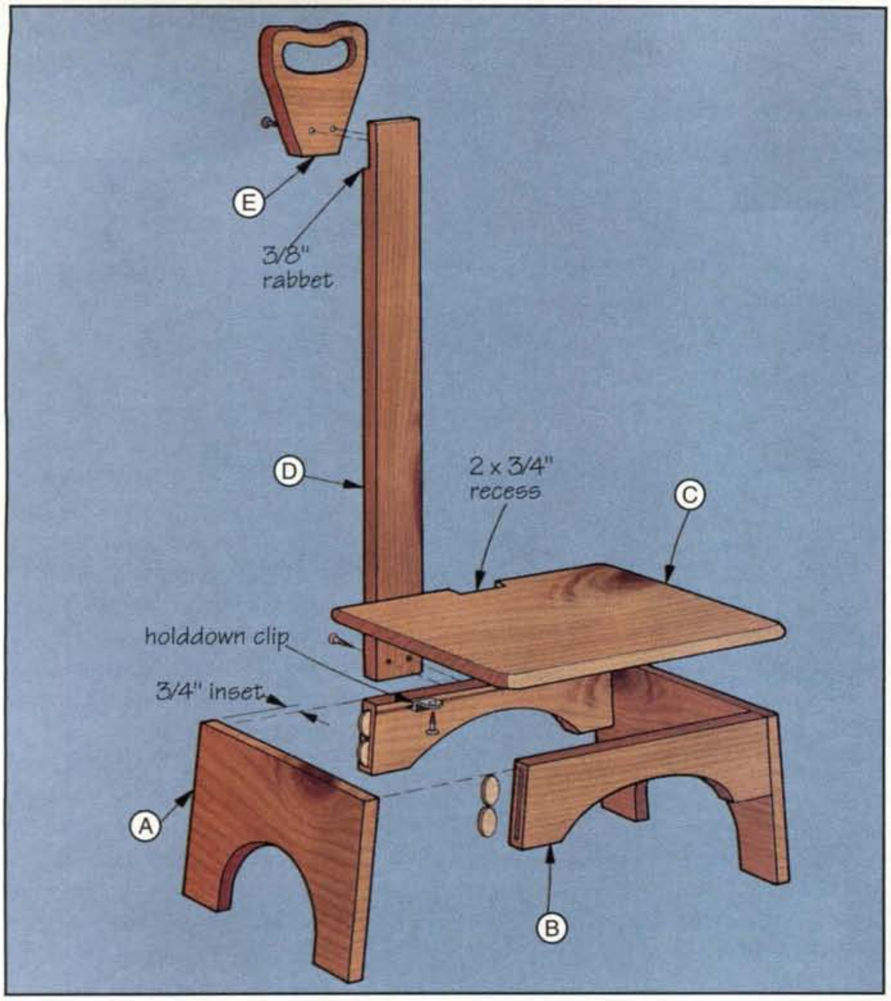
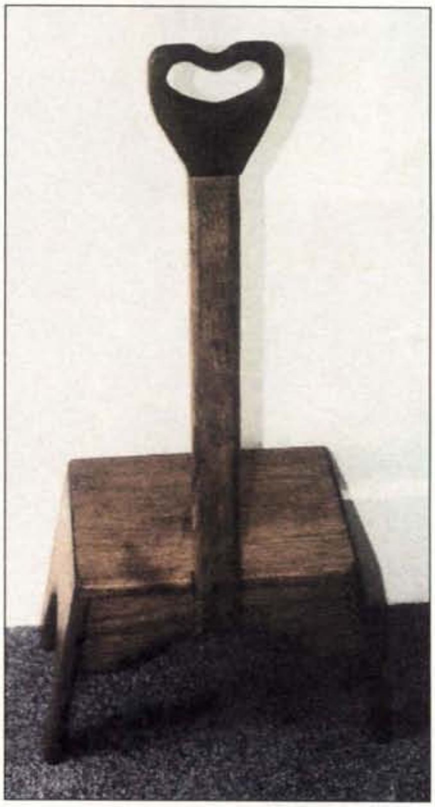
***Hugh Foster** is an English–teaching woodworker in Manitowac, Wisconsin, and the author of* The Biscuit Joiner Handbook *(Sterling Publishing, 387 Park Ave. South, New York, NY 10016).*



A Handy Stool					
Cutting List					
		Finished Size			
Qty	**Part**	**T**	**W**	**L**	**Piece**
2	A	¾"	9½"	10"	ends
2	B	¾"	4½"	12½"	sides
1	C	¾"	10"	12½"	top
1	D	¾"	2"	26"	stretcher
1	E	¾"	4½"	6"	handle

Cut the holddown clip dadoes, ⅛" wide X ⅜" deep, ½" below the top of each side piece.



Fit the stretcher into the recess in the top and fasten it to the rear side piece with glue and flathead woodscrews. Plug the screw holes.

these biscuit joints in case the user of the stool is very large.

Cut the top (C) to size as given in the Cutting List. Centered on one long side of the top, cut a 2" wide X ¾" deep recess for the stretcher. This can be cut with a dado setup on the table saw or routed—whichever method you're comfortable with. Sand the recess, then round over all edges of the top except the recess where the handle joins. Fasten the top to the base with holddown clips (available from The Woodworker's Store 612-428-2199, part #34215).

Cut the stretcher (D) to size as given in the Cutting List. Round over all sides except the bottom 2¾" which attaches to the base. With the table saw or router, cut a rabbet in the top of the stretcher ⅜" deep X 1" long to accommodate the handle (E). Drill and counterbore the bottom 2" of the stretcher for a pair of screws which hold the stretcher to the base. Glue and screw the stretcher to the base; then plug the screw holes. Transfer the handle pattern from the PullOut™ Plans and cut its profile on the band saw. Drill a starter hole for the inner part of the handle then cut out the void with a coping or jig saw. Round over both sides of the handle; drill and counterbore for attachment screws, then attach to the stretcher with two screws. Plug the screw holes. Finish the stool to match any decor.

You'll find that several of these stools can be built in a pretty short time. That's a good thing, too, because when I gave this one to my mother, I was called by at least half a dozen of her friends who each wanted a copy. PW

Step Ladder

A Popular Woodworking Project

by William Bigelow

I discovered this stepladder design while working on a community project. A friend brought several stepladders he had made. They varied in height from three to eight feet and all were extremely stable. My curiosity was aroused when I noticed that his stepladders were slightly different than other ladders I had seen.

***William Bigelow** works wood in Surry, NH.*

Stepladders generally slope 15° in the front, but the back angle is close to vertical to provide close access to a wall. These home–built ladders are constructed with the front and back slopes set 15° from vertical and thus have wider bases than common ladders. My friend's ladders are made from red oak and are slightly heavier than usual.

The different height ladders are made from the same dimensional stock and with the same layout—only the height and the number of steps vary. The length of each ladder is measured along the slope with each step one foot higher than the preceding one. The dimensions given here are for a six foot ladder. When selecting stock, pick straight grained oak or ash without structural defects.

Cut all the parts to size according to the Cutting List. Cut the step and rung stock to the correct width, but don't cut the individual pieces to length at this time. The steps will be cut to length after the edges are rounded over and the rungs are cut to length during final assembly.

Sight down the edge of each side piece (A) and lay the crown to the outside of the ladder. If the boards are slightly bowed, lay the bow toward the outside of the ladder as well. Mark the sides left and right and the outer edge of each side so they'll always be clamped together in the same orientation. Cut the 15° angle in the ends of both sides, then clamp them together to layout the step dadoes. Mark each step dado with a ½" chisel across both edges. The top of the first step is 12" above the floor.

Be sure to provide adequate support for the stock that overhangs the table saw.

Mark each step dado with a chisel to maintain proper orientation of the sides.

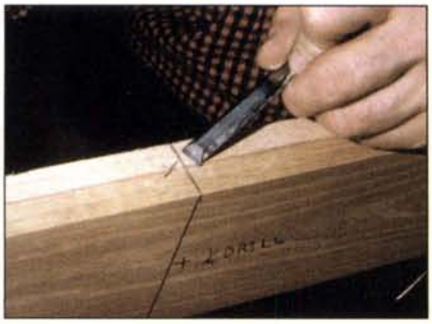
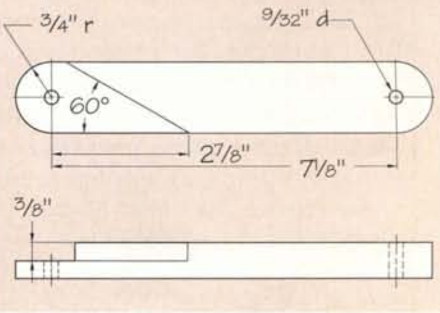
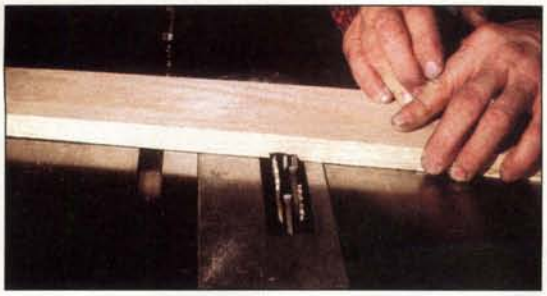


Figure 1. Locking Arm



Use your miter gauge to lay out the step dadoes.



Test the depth of the dado cut on a piece of scrap before cutting the sides.

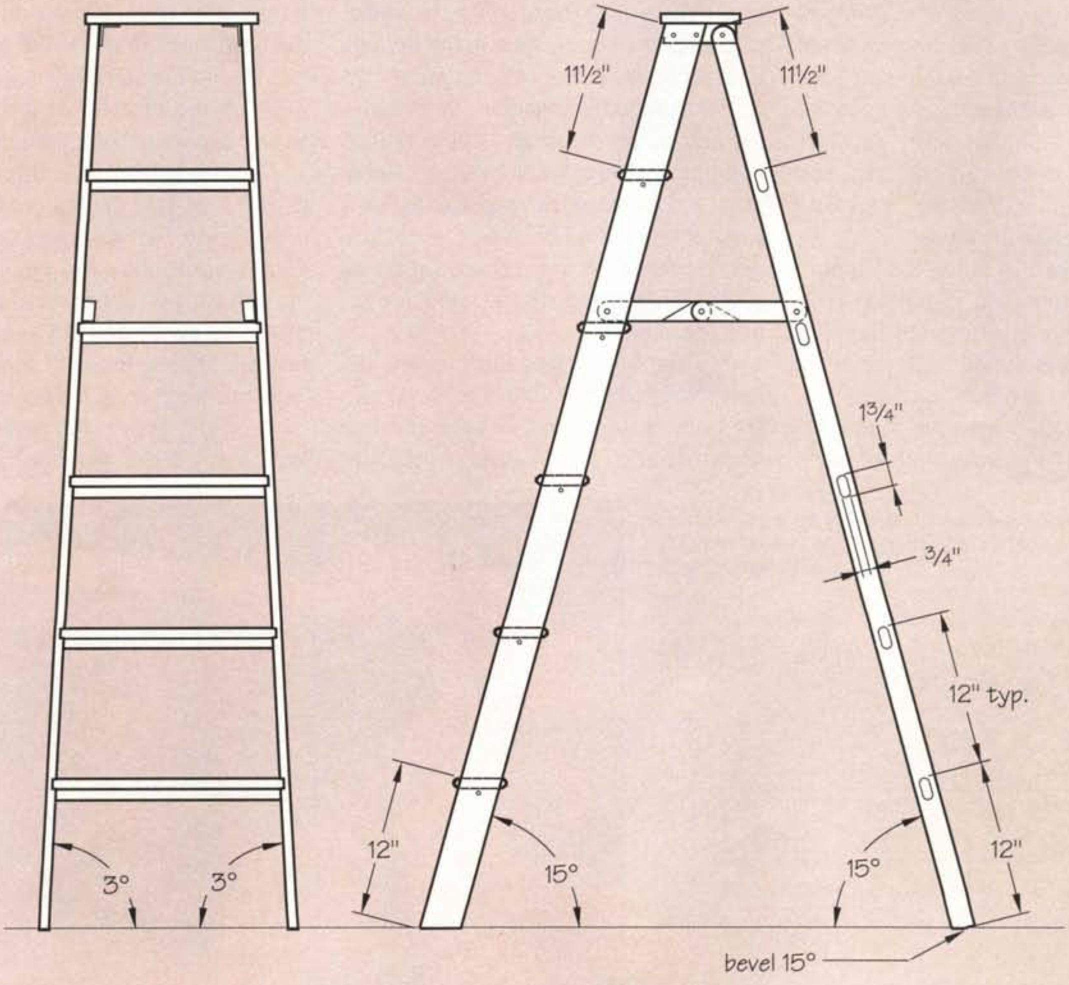
Succeeding steps are 12" above the step below. The chisel marks partway across each side piece are to remind you to cut the dadoes on the inside. A miter gauge from a table saw makes a handy layout protractor. Cut the step dadoes on the table saw with a ¾" wide dado blade set to cut 3⁄16" deep. Set the miter gauge at 15° and be sure all the dadoes are in the right direction.

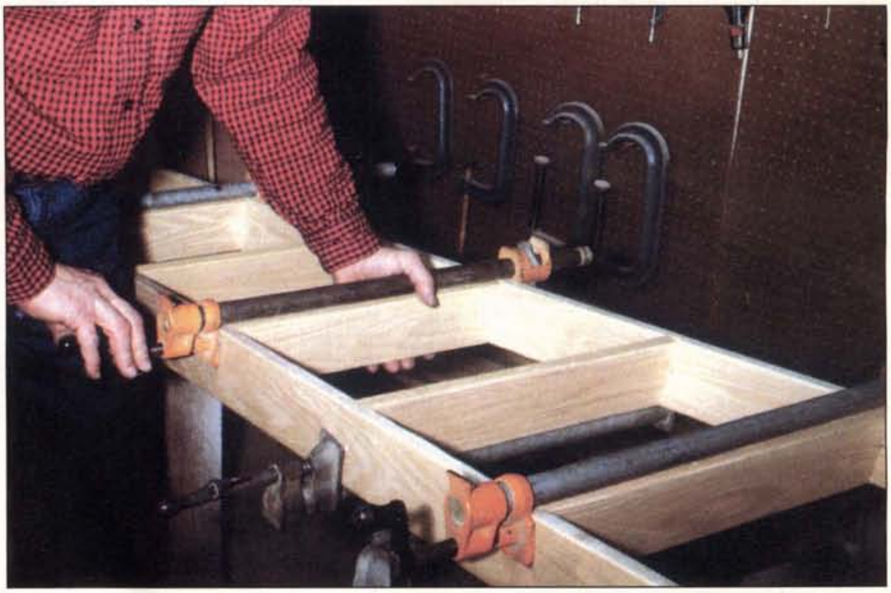
Drill 9⁄32" diameter holes in the ends of each locking arm (B) as located in Figure 1. Cut the lap joints on the four locking arm pieces as dimensioned in the figure. First raise the dado blade to cut ⅜" deep then remove the waste from the lap with the miter gauge set at 60°. Cut or belt sand the ⅜" radius curve on the ends of all four locking arm pieces.

Route a ¼" roundover on the exposed edges of all pieces except the rung stock, including across the end grain of the top and sides. Use a ⅜"

Step Ladder					
Cutting List					
		Finished Size			
Qty	Part	T	W	L	Piece
2	A	¾"	3"	72⅝"	sides
4	B	¾"	1½"	8⅝"	locking arms
1	C	¾"	1¾"	80"	rung stock
1	D	¾"	3¾"	75"	step material
2	E	¾"	1¾"	71¼"	legs
1	F	¾"	6"	13"	top
Supplies					
80"	¼–20 threaded steel rod				
2	5½" X 1½" X 1½" angle iron				
10	¼–20 nuts and washers				
10	1¼" drywall screws				
4	#10 X 1½" FH screws				
2	#10–24 X 1" bolts and nuts				
10	¼" X 1¼" carriage bolts, washers, and nuts				

Figure 2. Front and Side Views





Measure diagonally between each step. If the measurements are equal, then the sides and steps are in proper alignment. If not, loosen the clamps and realign.

roundover bit to round the edges of the rung stock. The rungs (C), routed on four edges, will match the mortises in the legs.

You may want to cut grooves with a router or table saw across the length of each step stock for better traction when you use the ladder. Make three grooves about ⅛" X ⅛" and centered across the width. Space them ¾" apart. Another option for traction control is to add non–stick traction tape to the steps after you complete the ladder.

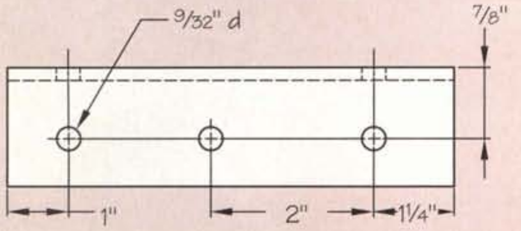
The width of the stepladder tapers out 1¼" per foot, top to bottom. The individual steps are different lengths. Cut them to length with a 3° angle at each end to fit the side dadoes. The first step (D) down from the top is 12" long. Add 1¼" progressively for each step (12", 13¼", 14½", etc.). Mark the top of each step to avoid putting them in upside down during assembly.

Clamp the sides together, then drill a 9/32" diameter hole centered across the width and ⅛" below each dado. Unclamp, then apply glue to the dadoes and clamp the sides (A) and steps (D). Check the ladder alignment by measuring across the diagonals. After the glue is dry, insert lengths of ¼–20 threaded steel rod under each step and place a washer and nut on each side of the ladder. Hacksaw off the threaded rod that protrudes beyond the nut and file off any sharp burrs.

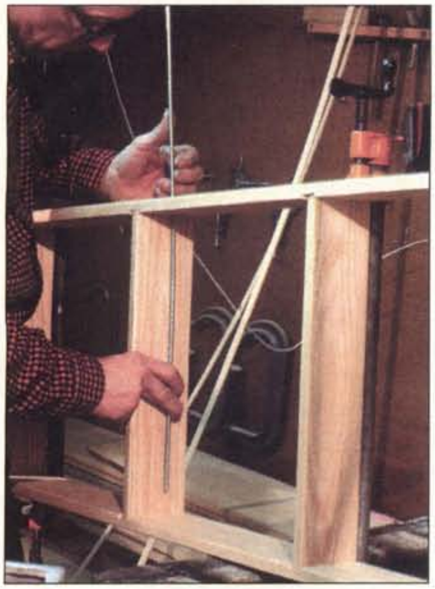
Lay out the mortises in the legs (E) as shown in Figure 2. Drill a ¾" diameter hole at each end of each mortise (centered ⅜" from each end) and remove the wood between the holes with a chisel. Cut the bottom end of the legs at 15° as shown in Figure 2. This allows the step ladder to be tilted against the wall with the legs properly on the floor when it's closed. Drill a ¼" diameter hole ¾" from the top of each leg. Round the top of each leg so it will pivot on the bracket at the top of the ladder without striking the top (F).

Cut two 5½" long steel brackets from 1½" X 1½" angle iron. Locate and drill the five 9/32" diameter bolt holes in each bracket shown in Figure 3. When cutting these holes use high–speed steel bits, go slowly and use a little cutting oil. The 3° taper of the sides and legs can be compensated for by sanding a slight taper where the bracket joins them. Paint the brackets to keep

Figure 3. Top Bracket



Nylon lock nuts might be a good choice in this situation so the ladder won't fall apart unexpectedly!



The ¼–20 threaded rod below each step serves to both support the step and keep the sides from spreading. Don't overtighten the nut—this may cause damage to the wood fibers and weaken the sides.

them from rusting.

To insure proper alignment when you insert the rungs, clamp the legs to the top of the assembled sides and steps with an ⅛" thick spacer between them. Attach the brackets to the top of the ladder with ¼" carriage bolts, washers and nuts.

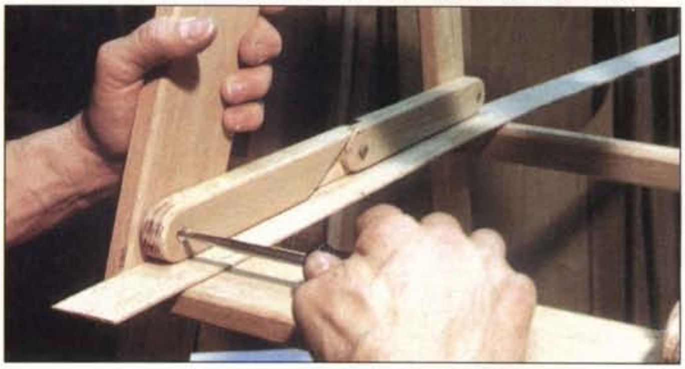
Cut the rungs (C) to length. The top rung is 13" before sanding to length. Each successive rung is 1¼" longer than the rung above. Tap a rung through one mortise and slightly into the opposite mortise. The rungs should fit snugly. Shave the rung if necessary to achieve a proper fit. Apply glue around the ends of the rung before driving it into the opposite mortise. Drill and countersink a hole through the leg and into the rung. Drive a 1¼" drywall screw into each end of the rung and saw off the protruding ends of the rung, then sand the rung flush with the leg.

Remove the clamps when the glue is dry and stand the ladder upright. Attach the top (F) to the brackets at the top of the ladder with ¼" carriage bolts. The locking arms are located across the stepladder above the second step from the top. Place a 3/16" thick shim across the step and the adjacent rung. Place the locking arms (B) on the shim and center the ends on the side and the leg. Fasten the locking arms to the legs and sides with #10 X 1½" flathead screws. Secure the lap joint in the center of the locking arms with a #10–24 X 1" bolt and two nuts locked together. Remove the shim after assembly to allow the locking arm to lock over center. Before using the ladder, double check that the bottom ends of the sides and legs are rounded over so they won't scratch or mar the floor. Remember, don't stand on the top step and check that the feet are on solid ground. Let the painting begin. PW

Secure the rungs with coated deck screws if you plan on leaving the ladder outdoors.

Clean up the mortises with a chisel. Protect the edge with a piece of scrap below.

Use a shim when securing the locking arms so they don't bind with the step.



Some Thoughts About Tools

by Ken Sadler

Let me offer some thoughts about woodworking tools, both power and hand, based on what I've learned from experience over many years. That experience has shown me that a cheap tool is the most expensive tool you can buy. Cheap tools won't do the job properly, so you often have to do it over. Cheap cutting tools won't hold an edge for long, so you'll have to sharpen them constantly or work with a dull edge. Cheap power tools are difficult if not impossible to set accurately and tend to drift from the settings, resulting in inaccurate work. A cheap tool is, of course, cheaply built and will wear out and need replacing sooner. My table saw is twenty–two years old. My lathe and drill press are both forty–three years old. They were the best I could buy and they still produce work of the same quality and accuracy as they did when new.

I'm not about to discuss tools in general, how they work, or compare one make against another. Magazines and books are full of this information. I'm going to talk about the tools I consider important for making furniture—the essential, the not–so–essential, and those I think are a luxury. I'm going to set out the tool qualities that my experience has shown me are necessary in order to do the work expected of a craftsman.

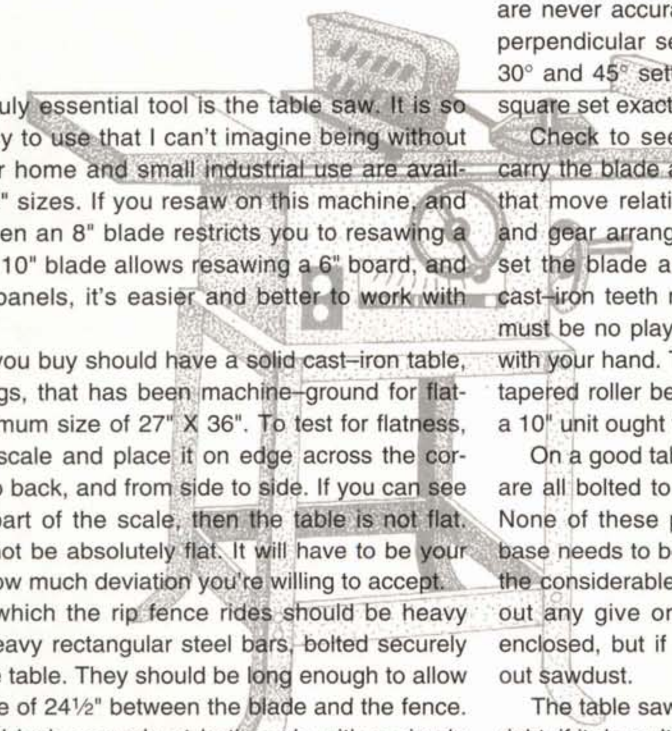


Table Saw

For me, the truly essential tool is the table saw. It is so versatile and easy to use that I can't imagine being without it. Table saws for home and small industrial use are available in 8" and 10" sizes. If you resaw on this machine, and most of us do, then an 8" blade restricts you to resawing a board 4" wide. A 10" blade allows resawing a 6" board, and when gluing up panels, it's easier and better to work with 6" boards.

The machine you buy should have a solid cast–iron table, including the wings, that has been machine–ground for flatness, with a minimum size of 27" X 36". To test for flatness, take a 36" steel scale and place it on edge across the corners, from front to back, and from side to side. If you can see light under any part of the scale, then the table is not flat. Most tables will not be absolutely flat. It will have to be your judgment as to how much deviation you're willing to accept.

The bars on which the rip fence rides should be heavy steel tubing or heavy rectangular steel bars, bolted securely to the edge of the table. They should be long enough to allow at least a distance of 24½" between the blade and the fence. The fence should lock securely at both ends with a simple lever action and have a knob for fine adjustments. The fence itself is best made of steel and should have two holes clear through side to side, one at the front and one at the back, to allow the attachment of an auxiliary fence. Don't worry about the measurement markings on the rail and the indicating finger on the fence. They never remain accurately set, and you should always make your fence setting with a steel scale, measuring directly between the fence and the blade.

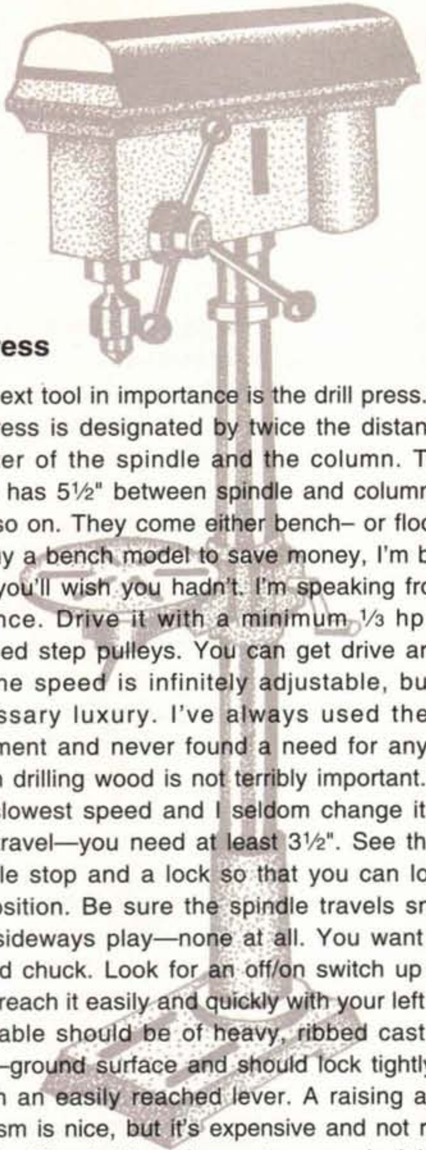
The miter gauge must have a steel blade that fits in the table groove with no play—even when pulled back so that only half of the blade is in the groove. The head of the gauge should be heavy die–cast metal, preferably steel, but never plastic. Again, don't worry about the degree markings. They may be marked accurately on the gauge, but the pin to which you set the markings never stays put. I have a set of draftsman's triangles and if I want an accurate angle cut I set the miter gauge using one of them. The devices often present on these gauges allowing you to get quick 90° and 45° settings are really useless and dangerous because the settings never hold for very long. If you depend on them you're apt to find, too late, that what you thought was a 90° cutoff, isn't. And don't depend on the gauge on the saw to set your blade angle, particularly the perpendicular position. These gauges are never accurate. I use a 6" steel try square to make the perpendicular setting, and my draftsman's triangles for the 30° and 45° settings. For other angles I use a sliding bevel square set exactly with a protractor.

Check to see if the yoke and trunnion assemblies that carry the blade arbor are cast–iron, and the mating surfaces that move relative to each other are machined. The worm and gear arrangements that raise and lower the blade and set the blade angle should have a steel worm running in cast–iron teeth machined into the trunnion and yoke. There must be no play in these parts when you try to wiggle them with your hand. The blade arbor should be mounted in ball or tapered roller bearings and be belt driven, and the motor for a 10" unit ought to be at least 1½ hp.

On a good table saw, the yoke, trunnion, and motor mount are all bolted to the underside of the heavy cast–iron table. None of these parts should be attached to the base. The base needs to be heavy steel and well–braced so it can bear the considerable weight of the top and blade assembly without any give or wiggle. It doesn't necessarily need to be enclosed, but if it is, there should be an easy way to clean out sawdust.

The table saw is at the heart of everything you do. If it isn't right, if it doesn't do accurate work, then no matter how skilled a craftsman you are, you won't be able to do good work. You'll be fighting the machine constantly and the frustration will destroy any pleasure you hoped to get from your work.

***Ken Sadler** lives in Portland, Oregon and is a contributing editor with Popular Woodworking.*



Drill Press

The next tool in importance is the drill press. The size of a drill press is designated by twice the distance between the center of the spindle and the column. Thus an 11" machine has 5½" between spindle and column, a 14" has 7", and so on. They come either bench– or floor–mounted. If you buy a bench model to save money, I'm betting in six months you'll wish you hadn't. I'm speaking from personal experience. Drive it with a minimum ⅓ hp motor and four–speed step pulleys. You can get drive arrangements where the speed is infinitely adjustable, but this is an unnecessary luxury. I've always used the four–step arrangement and never found a need for anything more. Speed in drilling wood is not terribly important. Mine is set for the slowest speed and I seldom change it. Check the spindle travel—you need at least 3½". See that it has an adjustable stop and a lock so that you can lock it in any given position. Be sure the spindle travels smoothly and has no sideways play—none at all. You want a minimum ½" keyed chuck. Look for an off/on switch up front where you can reach it easily and quickly with your left hand.

The table should be of heavy, ribbed cast iron with a machine–ground surface and should lock tightly to the column with an easily reached lever. A raising and lowering mechanism is nice, but it's expensive and not really necessary. If the tilting table option costs more, don't buy it. These tables tilt side to side but not back to front. That's not worth the money for woodworking. In jobs of any size, your piece runs into the column. Instead, make an auxiliary table top of ¾" plywood and bolt it to the regular table. Mine is 14" x 30" which gives good support to pieces up to six feet long. To be able to drill angled holes on large panels, build the simple angle drilling fixture that I described in the November 1990 issue of *Popular Woodworking*.

Jointer

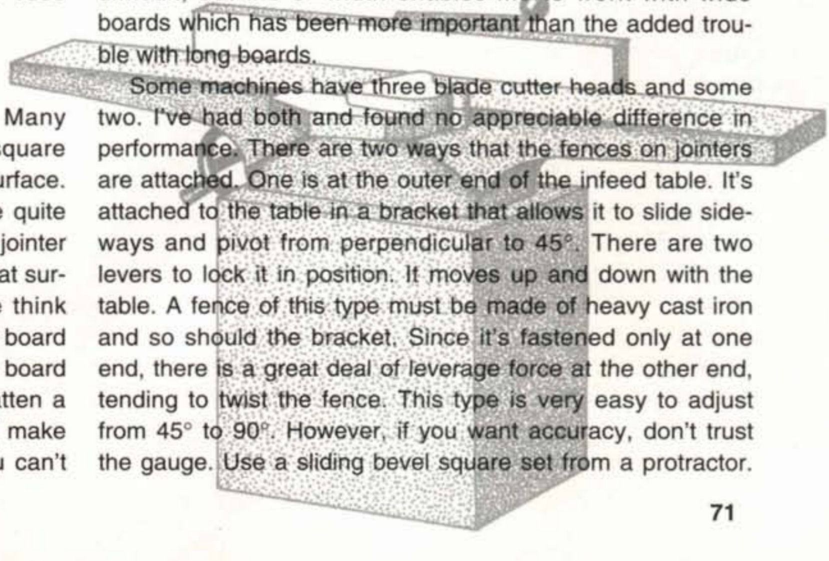
The jointer is a frequently misunderstood tool. Many assume that its main purpose is to put a straight, square edge on a board, or to quickly smooth up a sawn surface. These are important uses but they can both be done quite easily with a hand plane. The really important job for a jointer is to put a flat surface on a board. Until you have one flat surface you can't do any accurate work. Many people think that's the job of a planer. However, if you put a warped board through a planer, you'll get a smooth surface—but the board will still be warped. There is no way a planer can flatten a board. Once you have one flat surface, the planer will make the board a uniform thickness and it will be flat. You can't resaw a board until you have a flat surface to work from, and you can't make a square edge without a flat surface.

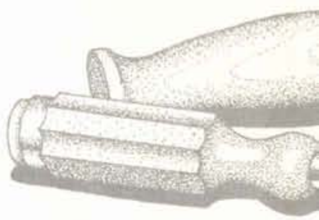
Jointers used in home shops and small industrial operations are 4", 6" and 8" wide. For the reason an 8" table saw is too small for furniture–making, so is a 4" jointer. You really need a 6" machine, and if you can afford it, get an 8". The machine is made up of a base, two tables (infeed and outfeed) a cutter head, and an adjustable fence. The base and tables should be cast iron and the table tops should be machine ground for flatness.

In some machines both tables are adjustable for height, in others only the infeed table adjusts. If they move, the tables should run on machined ways so they stay level and parallel regardless of position. The tables should be easy to move, usually by turning a threaded rod in a nut fixed to the table. This mechanism is under the table and unless protected in some way is open to dust and fine shavings. Therefore you can't lubricate the rod and nut except with powdered graphite, and without protection the dust and shavings get into the threads and make turning hard, and, after a while, impossible. My jointer has this problem and I constantly have to get underneath and clean out the stuff in the threads. Also, the knob that turns the rod is too small, making things more difficult.

Different makes come with different overall table lengths, ranging from 2½ feet to 8 feet. The longer the table, the easier it is to work on the machine. Unfortunately, long table machines cost big bucks, so some of us have to settle for the short ones. If I were strapped for money, I would rather have the wider cut than the longer table. I have an 8" jointer with 30" long tables. On longer pieces this has made the job more difficult, but the 8" width enables me to work with wide boards which has been more important than the added trouble with long boards.

Some machines have three blade cutter heads and some two. I've had both and found no appreciable difference in performance. There are two ways that the fences on jointers are attached. One is at the outer end of the infeed table. It's attached to the table in a bracket that allows it to slide sideways and pivot from perpendicular to 45°. There are two levers to lock it in position. It moves up and down with the table. A fence of this type must be made of heavy cast iron and so should the bracket. Since it's fastened only at one end, there is a great deal of leverage force at the other end, tending to twist the fence. This type is very easy to adjust from 45° to 90°. However, if you want accuracy, don't trust the gauge. Use a sliding bevel square set from a protractor.





The other type of fence attaches to a bracket fastened to the infeed table near the middle of the machine. This type does not need to be so heavily constructed. It has an entirely different mechanism for adjusting the angle, one that is nearly impossible to set accurately. You have to use squares to get the angle you want.

If you're going to take any but the lightest cut, you'll need a powerful motor, especially for the wider cuts. I have a 1 hp on mine and a full width cut 1⁄32" deep in hardwood can slow it down appreciably. Whatever your cutter size, I wouldn't have less than ¾ hp. As for the stand, you want it made from heavy steel and very solidly built. I suggest that you lag it to the floor. When you're edge jointing a 2" X 10" board 4 or 5 feet long, you don't want the machine walking away from you. The on/off switch should be the safety push–button type, close to the infeed end and on the working side of the machine, easily and quickly accessible.

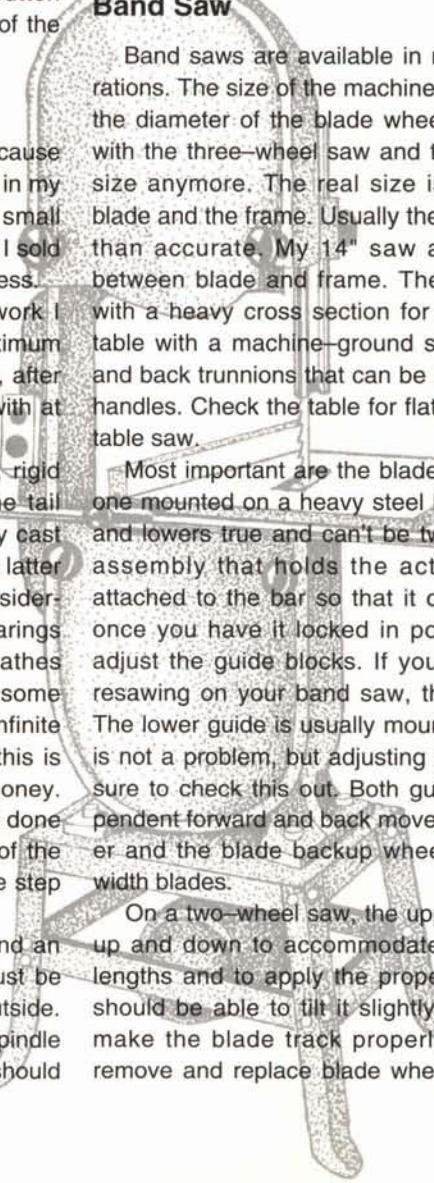
Lathe

My next most important tool is the lathe, probably because I like using it and have therefore leaned toward *turnings* in my furniture designs. I've also used the lathe to create small objects like bowls, candle holders and weed bottles that I sold to keep me going while I was building my furniture business.

Lathes come in a variety of sizes. For furniture work I would have nothing less than a 12" swing and a maximum length capacity not less than 36". Anything smaller will, after a while, cause you to be dissatisfied. I would drive it with at least a ¾ hp motor, better a 1 hp.

To do accurate work a lathe must have a heavy, rigid cast–iron base with carefully machined ways for the tail stock to ride on. The head stock should also be heavy cast iron and the spindle set in tapered roller bearings. The latter is very important because in turning, you'll exert considerable thrust force on the spindle, and tapered roller bearings are the only type that will handle this thrust. Most lathes have a four–step pulley in the head stock, although some are now made with a variable speed drive to get an infinite number of speeds. As in the case of the drill press, this is an unnecessary luxury and not worth the additional money. I have found over the years that most of my work was done at one of two speeds and even when I needed one of the other two, it was no trouble to switch the belt from one step to another on the pulleys.

The spindle should have a #2 morse taper bore and an exterior 1"–11 NC thread at each end. The thread must be right–hand on the inside end and left–hand on the outside. This allows a variety of chucks to be inserted in the spindle and face plates to be screwed onto it. The tail stock should also be heavy cast iron, carefully machined to slide on the bed ways, and have an easy method of locking firmly in place so that its spindle is absolutely parallel to the heartsick spindle. This should also have a #2 morse taper bore. The tail stock spindle must have a crank handle to move it in and out and should be calibrated so you can tell how far you've moved it. There must also be a lever lock to hold the spindle where you've positioned it. A good solid tool rest is essential and an there must be easy way to lock it in place. You need two tool rests, a short one about 4" long and one 12" long. These can be cast or welded steel,as long as they are of heavy cross section so they'll be strong enough to stand up to the work. I would also be sure to get a good steady rest—if you're going to turn long thin pieces you'll need it.

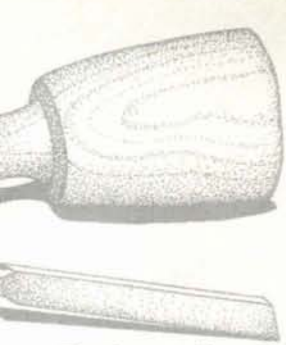


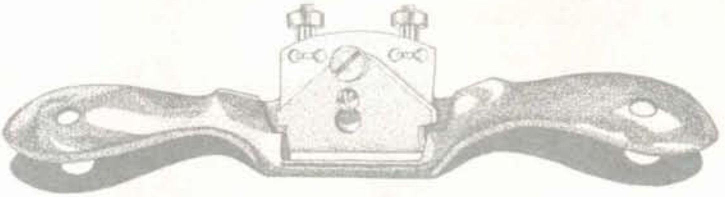
Band Saw

Band saws are available in numerous sizes and configurations. The size of the machine was originally determined by the diameter of the blade wheels. Then someone came up with the three–wheel saw and that didn't really describe the size anymore. The real size is the distance between the blade and the frame. Usually these figures are nominal rather than accurate. My 14" saw actually has 13" clearance between blade and frame. The frame should be cast–iron with a heavy cross section for rigidity. Look for a cast iron table with a machine–ground surface and mounted in front and back trunnions that can be locked in position with simple handles. Check the table for flatness in the same way as the table saw.

Most important are the blade guides. You want the upper one mounted on a heavy steel bar arranged so that it raises and lowers true and can't be twisted from side to side. The assembly that holds the actual guide blocks must be attached to the bar so that it can't move from side to side once you have it locked in position. It should be easy to adjust the guide blocks. If you expect to do any accurate resawing on your band saw, then these points are critical. The lower guide is usually mounted in a way so that twisting is not a problem, but adjusting the guide blocks often is. Be sure to check this out. Both guide holders must allow independent forward and back movement of the guide block holder and the blade backup wheel to accommodate different width blades.

On a two–wheel saw, the upper one should be adjustable up and down to accommodate blades of slightly different lengths and to apply the proper tension to the blade. You should be able to tilt it slightly back and forth vertically to make the blade track properly. You ought to be able to remove and replace blade wheel covers quickly and easily.





For the machines that need a stand, I prefer a heavy steel frame, open all around. The enclosed ones are made of sheet metal, and while they are generally sturdy enough, the sheet metal can vibrate when the saw is running and the noise can drive you crazy. Again be sure that the on/off switch is a push–button safety type and located where you can reach it easily while working. Power depends on what you want to do. I have a ¾ hp motor and resaw 8" wide boards easily.

One last point—just because a saw is 20" and stands on the floor does not necessarily mean that it's better quality than a 14" on a metal stand. Only that it's more expensive. I have a 14" on a metal stand that has served me very well for fifteen years—and it's done some very heavy work.

Hand Power Tools

There are four portable tools that I've found very handy to have around the shop. The first is a hand–held power circular saw. I have a good quality, medium–priced unit with a 7" blade. I use it almost entirely for rough–cutting, particularly long, wide, rough planks, up to 2" thick, into shorter lengths that I can handle on the table saw and jointer. The second is a hand–held power drill. Mine is a standard pistol grip, variable speed with reverse, with a ⅜" keyed chuck. Again medium–priced. I use it whenever I can't get a workpiece into the drill press. Some craftsmen get a ½" unit, but I think that's too big, heavy and unwieldy for furniture work, not to mention being more costly. The hand–held jigsaw is a tool I don't use very often but on certain work it's very nice to have around. For example, when you have to rough–cut a 42" diameter table top. To do the job by yourself on a band saw is very difficult, and since you're holding the panel at a point quite a distance from the blade, it's easy to cut on the wrong side of the line. The work becomes easy when you do it with the hand–held jigsaw.

The fourth hand power tool in my shop is the router. I'm not a router fan and, frankly, my greatest use of the tool is as a shaper mounted in a table that I made. I use it as a router primarily for cutting dadoes or rabbets I can't do on the table saw, for cutting long dovetail slots, and for molding the edges of pieces that are too big to handle on the shaper table. I've found that cutters with ball bearing guides are worth their added cost. One thing I never do with a router is cut joints, particularly dovetail joints. A dovetail joint cut with a router is so obviously machine–made that it loses the individuality that a craftsman can put into a hand–cut joint. Many swear by a router for many jobs. Do what feels right for you. That's the value of building your own furniture—it's your work, so do it your way. But remember, the result is yours, too.

Hand Tools

To write my thoughts on hand tools would take a book in itself. There are certain tools that it's very nice to have and I'll mention them briefly. I've found the spokeshave indispensable for furniture work. They come in three basic forms: the standard flat sole spokeshave with two adjusting screws for setting the blade position, the same tool with a curved sole, and the adjustable throat spokeshave. If you've built any of my projects in this magazine over the years, you'll remember that I've often referred to this tool as the best way to do innumerable shaping jobs on parts of a piece of furniture. A shoulder plane is very handy for cleaning up rabbets, shaving tenons to fit, and numerous other jobs that crop up. They come as long–nose or bull–nose and sometimes you can buy both noses to fit on one base. Another handy little tool is a hand router, not the large size with two round handles, but the small size that you hold between the thumb and forefinger of each hand. I use this to clean up and work to uniform depth long dadoes, particularly cross–grain. It's also great for cleaning up certain types of hinge mortises to a uniform depth.

There are many sizes and styles of chisels. For me, the short blade butt chisel has been the best. I use it for nearly every job requiring a chisel. I have a complete set from ⅛" to 2" in ⅛" increments up to 1" and in ¼" increments from there. I like the shorter blade because they are easier to control whether working by hand or with a mallet. As to hand planes, I have a cabinet full of them, but the three that get most use are the smooth, jack and jointer models. None of my planes are new; I've had most of them for more than forty years. To get a good quality hand plane today, you have to buy one made in Europe or Japan. Some have old line American manufacturer's names on them, but they're made overseas. An important point about hand planes—be sure that the sole is absolutely flat, side to side and front to back. On many of the cheaper models the sole has been finished by being hand held against an emery belt, rather than being machined. Only a machined sole will be flat.

It is the same with hand tools as with power ones. The cheap tool is the most expensive tool you can buy. Unfortunately the American tool companies have dropped out of the quality hand tool market. In the past ten to fifteen years the only quality hand tools I've been able to find are made in England, Germany or Japan. They are expensive but worth it. When you're looking for a new tool (the used market for quality hand tools is almost nonexistent) don't go to an ordinary hardware store. Look for a specialty store and if you can't find one, look in the woodworking magazines to find one of the many catalogue houses. In my opinion the best catalog over the years has been Woodcraft. PW

A Popular Woodworking Project

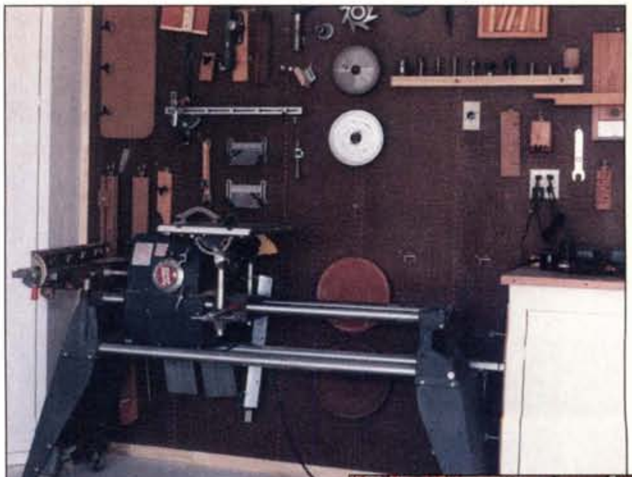
Shop Planning

A place for everything, and everything in its place.

by Hugh F. Williamson

I recently set up a new home workshop, and since this is my sixth shop, I thought my experience might prove beneficial to others. The worst of my shops was a 10 X 12 basement room with low ceilings—I had to cut plywood panels in half to get them down the stairs. Cabinets under construction often had to be assembled upstairs in the living room—not the best location for clamps and glue. I've found *that* combining the shop with the garage is probably the most common and best way to achieve easy access for lumber and sheet goods. Unfortunately, the car usually ends up stuck outside while you're working on larger projects.

For the average do–it–yourselfer, woodworking is probably 80% of what goes on in the home shop. Most of us also do general repairs and dabble in automotive, metalwork and some electrical/electronic. My shop touches on all these activities.



Pegboard storage is convenient, versatile and inexpensive. You can adapt it to hold most shop tools and other miscellaneous essentials.

Layout

Start by drawing up a general layout. Of the many activities and uses you'll need to provide space for, storage is usually the toughest. You must allow for storage of power tools and hand tools that you now own and those you hope to purchase in the future. You must be able to stow lumber and sheet stock—which usually requires nine to ten feet of wall space with good access. And you'll need a place to store the odd–shaped cutoffs that are too good to throw in the kindling box. Paint, stain, varnish and all the necessary solvents can be highly flammable and toxic, so select their storage area with care. Nails, nuts, bolts, washers, and the like are the staple supplies of every shop, but don't forget space for sandpaper, sanding belts, spare blades, paintbrushes and spare parts.

There are a lot of ways to store small supplies beyond those old standbys, the coffee can and the baby food jar. Stackable plastic bins are very neat, come in many convenient sizes, and can be color–coded. Most of us use a combination of storage containers, so plan your shelf depth and spacing to accommodate your containers efficiently.

***Hugh F. Williamson** is a retired physician who works wood from home shops in Tucson, Arizona and Dolores, Colorado.*

The rolling shop caddy (left) and machinist tool cabinet offer lots of storage for small parts and tools and help save floor space.

I never seem to have enough clamps and good accessible clamp storage is tough. Jig storage is even tougher. I like to make and use jigs but hate to throw them out when the job is finished—when I do I inevitably need them again. Most of my jigs are hanging on pegboard or from the ceiling, and I must admit that when I look at some of them now, I am left wondering what they were for. Make a note with a marking pen on those you save to avoid this potentially embarrassing problem.

Pegboard storage is convenient, versatile and inexpensive. You can adapt it to hold most shop tools using the wide variety of pegboard hooks, holders and other devices commercially available. I recommend using ¼" pegboard screwed to studs on 16" centers because you'll be hanging a lot of weight on these hooks. The ⅛" pegboard just won't cut it. If you're applying it to a solid wall, you'll need furring strips or spacers. I cover all the interior shop walls from *floor* to ceiling with ¼" pegboard before installing any cabinets or benches. It acts as a back for the cabinets as well as providing great flexibility in storing small and medium–size items.

You'll need lots of drawers and cabinet space for storing smaller tools and accessories. I standardized door and drawer cabinets to fit most of my needs and to make construction quick and easy. Try to put everything you can into a cabinet to keep it out of sight and free of shop dust.

Store your clamps close to the area where you assemble your work. Pegboards again offer convenience and a simple rack made from broom clips holds the pipe clamps.

Floor storage space always disappears quickly—carts, sawhorses, benches, roller supports, bins and trash barrels just eat it up. Decide now whether you can live with the car outside—if not, reserve space for it.

If you're blessed with a high ceiling, consider storing lumber and perhaps some power tools overhead. I've seen overhead hoists used in home shops to keep seldom–used power tools completely out of the way.

Shop Power

Your shop layout may also depend on your power requirements, compressed air, vacuum, dust collection, lights and perhaps water. A big arc welder requires 230V and a 50 amp breaker. Most 230V tools will safely operate on a 20 amp circuit, but play it safe and check your tool manual. Most 115V circuits are fine with a 20 amp breaker. Don't under–power your shop; you may add bigger and more power–hungry tools in the future. A separate shop power panel is a great convenience.

Air tools are becoming more popular and much more affordable, so compressed air piped throughout the shop can be very handy. Be sure to check the manual with your compressor to see if it requires a dedicated 230V line. Steel pipe is recommended for your air lines; if you use plastic be certain it's rated for high pressure. If you use air tools that require lubrication, you'll want to install an automatic oiler to save you a lot of hassle. Quick–change hose couplers are a must. Self–coiling hoses or reels will keep them out of the work area and out of the way. Since you must drain the water from your compressor periodically, you might want to consider installing an automatic drain.

Compressed air is almost a necessity in today's workshop. The use of air tools is increasing and I use it for cleaning.

Every shop has a portable shop vacuum with an assortment of heads. The newer vacuum dust collectors come in many types and sizes and can be portable or built–in with 4" to 6" duct work, permanently installed with gate valves throughout the shop to control the air flow at individual tools. If you use the less expensive and easier to install plastic pipe ducts, you must run a continuous ground wire inside them to eliminate static electricity and the potential for an explosion. Metal pipe ducting acts as its own continuous ground.

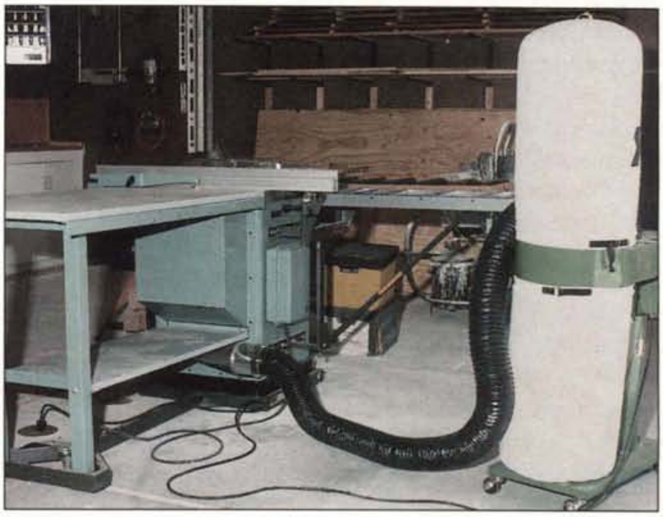
Long duct runs and every "T" and "Y" bend reduce the efficiency of the dust collector. I work in my shop alone and am able to plan my work so that I do all of the cutting, shaping and sanding at one time. That way, it's no more trouble to move my portable dust collector than it would be to run around opening and closing gate valves, and I get better efficiency. The choice is yours, but don't ignore dust collection—wood dust is more dangerous than most people realize, and so is a dirty shop.

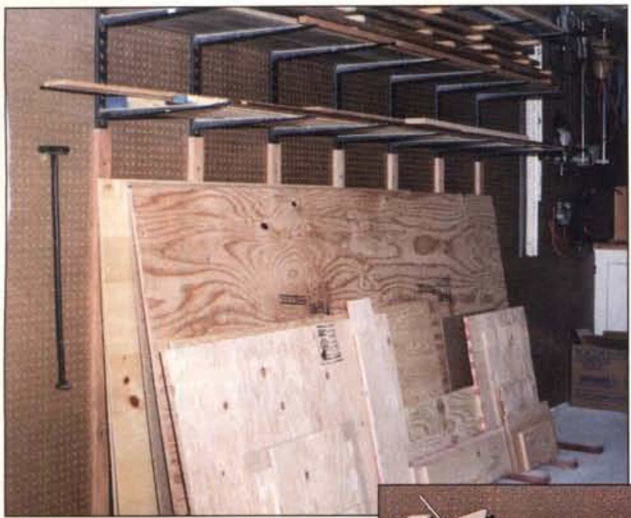
This trash container is easily removed from the cabinet for emptying.

A whole volume could be written on shop lighting. Take into account the height and color of the ceiling, floor space, windows and doors, and the type and location of the overhead fixtures. Most shops use overhead fluorescents for general lighting and additional fixtures directly over tools or benches for task lighting.

Woodworking Shop

How much space should you dedicate to wood storage? Some of us visit the lumber yard and pick up just what's needed for the current project. Others find a good selection


Portable dust collectors help keep the shop environment a better and safer place to work.



Heavy duty wall brackets held in place with ⅜" lag screws will support 300 lbs. of lumber each at 1" from the tip. The sheet material is elevated from the floor and rests against the wall. 5 gallon plastic pails are handy for storing scraps and doweling.

at a great price and stock up for future projects. Whatever amount you set aside, locate it close to a large outside door. It also helps if wood storage is convenient to your major cutting area—the table or radial arm saw.

I like to place sheet goods on 2 X 4 X 24" redwood studs to prevent moisture damage. I simply lean the sheets against the wall for support, with the smaller sheet remnants towards the front. Give yourself room on each side so you can slide sheets in and out.

I installed 24" heavy duty commercial brackets on each wall stud, 55" from the floor, in order to stack lumber on adjustable arms above the plywood storage. These bracket arms will support 300 pounds each at 1" from the tip, and also come in 10" and 18" lengths. You can make your own wooden lumber supports, but they won't be adjustable, won't support as much weight, and you'll lose a lot of storage space because of the angle braces you'll have to add.

When allocating space, it's essential to consider ahead of time the area you'll need for cutting on the table saw. The largest cut will most likely involve 4 X 8 sheets, which require clearance in front, in back and on both sides of the saw. Even with help, cutting large panels can be very dangerous—work under good lighting, keep the area free of obstructions, and set up good support on all sides throughout the cut.

If you equip your table saw with casters, you can position it temporarily where there's room to accommodate large cuts. A number of work supports are available commercially or make them in your shop, using rollers to support the work piece as it passes through the blade.

If possible, place your jointer side by side with the saw so you can cut and joint with a minimum of steps. If your major cutting is done on a radial arm saw, the same suggestions apply—you'll want adequate bench support on both sides of the saw.

Fire extinguishers should be placed in conspicuous locations including every exit doorway.

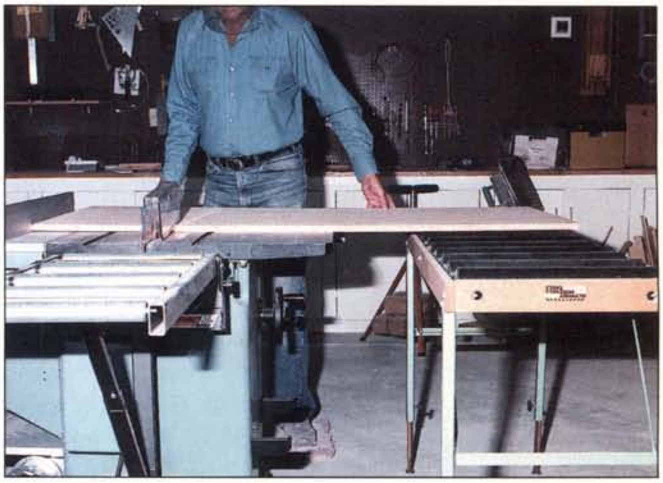
A small chain hoist located close to a garage door will prove handy. The rafters were reinforced to carry the extra load and the hoist is removed when it's not in use.

After allocating space for storage and cutting, think about where you'll assemble, glue and clamp. The space required will vary with the type of projects you like to knock out. If you construct large pieces of furniture, you'll want to assemble close to a clamp storage rack. I often use a sheet of ¾" plywood on standard or short sawhorses as a temporary assembly table, as well as for sanding and finishing. If you have a dedicated sanding bench or clamping table, mount it on casters.

Your remaining power tools should be strategically located about the shop to facilitate use and the accessibility of power and dust collection. There is no fixed rule in determining the location of power tools in a one–man shop. Be certain that the location of one tool does not interfere with the operation of another. When space is tight, commercially available mobile bases are helpful; they raise the tool only ¾" and have good locking brakes.

Ideally, you should keep your hand–held power tools in a dust–free environment. If you have small children you might want to lock them up. Store larger, seldom–used tools on cabinet shelves. Tools I use frequently are kept out in the dusty shop for convenience, usually up on the pegboard to keep them off the bench. I wrap the power cords around the

Collapsible roller stands offer safety when sawing large pieces of stock and help open up floor space when not in use.



This machinist vise is mounted on a 2" X 6" scrap with a cleat for clamping into the woodworking bench vise for use as needed.

tools for storage, although this can strain the cord. Cordless tools and their batteries have improved considerably over the past few years, but then you've got to plan space for the chargers.

Metal Shop

Woodworking may be your real interest, but undoubtedly you'll need to dabble in some metalworking eventually. You may repair or even make your own band saw blades, or perhaps some of your own hardware. If you're into welding, an arc welder and gas tanks require floor space and adequate power and ventilation as well. If you don't have a grinder, consider getting one to keep your tools sharp. A heavy vise is handy, especially if it has a combination pipe jaw and anvil surface. Metalwork also requires special hand tools usually not found in a woodworking shop, including special clamps, vise–grip pliers, punches and chisels. It's most convenient if you can allot separate space for this work.

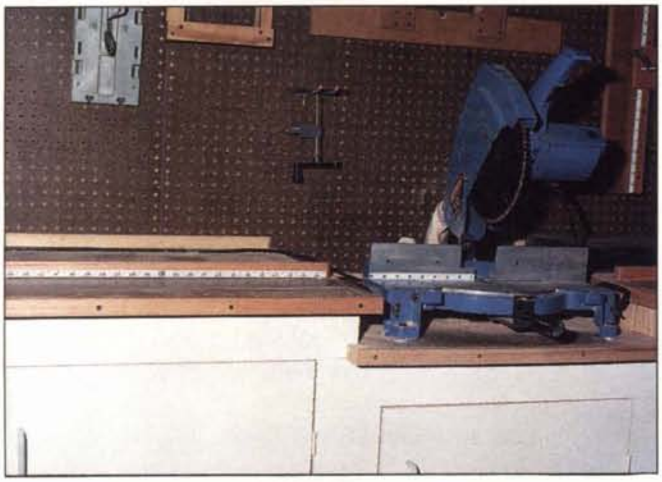
Electrical and Electronic Repairs

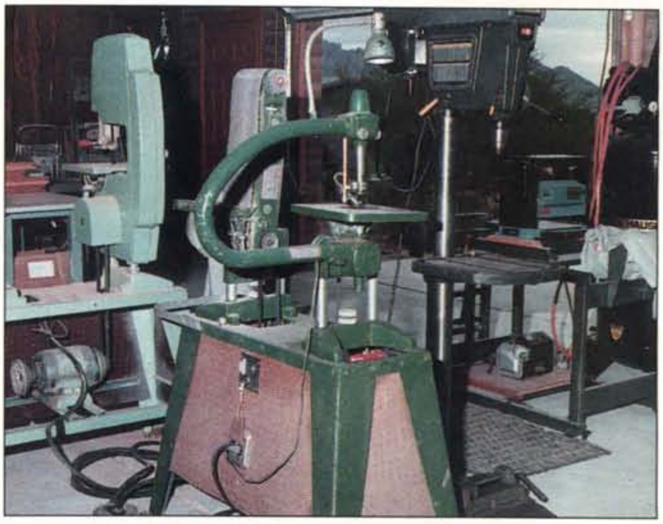
We all have to replace lamp and power tool cords periodically, and some of us enjoy home wiring projects or assembling electronic kits. There's a bare minimum of test equipment, soldering pencils and guns, special pliers and tools you'll need—plan some bench and cabinet space for these essentials.

Base Cabinets

I deviated from traditional cabinet construction for my shop cabinets. I wanted extra support and I don't intend to ever move them. The bench tops are 37" from the floor—decide what's right for you. The construction is ¾" plywood rather than particle board for increased strength. You should be able to cut four side panels from one sheet with material left over for shelves. Note that there's a difference in the notch cut for the end panel (see the figure on page 79).

The miter saw is recessed to provide level support on both sides of the blade for long stock.





My stationary tools are all mounted on casters so they can readily be moved into any area for use or for storage to free up needed floor space.

Cut dadoes for the drawers and bottoms on the table saw. Secure two 2 X 4 supports to the wall studs using a level. Attach the side panels to the supports with glue and screws; predrill screw holes to prevent splitting. Use a third 2 X 4 as a toe kick plate and front bottom support.

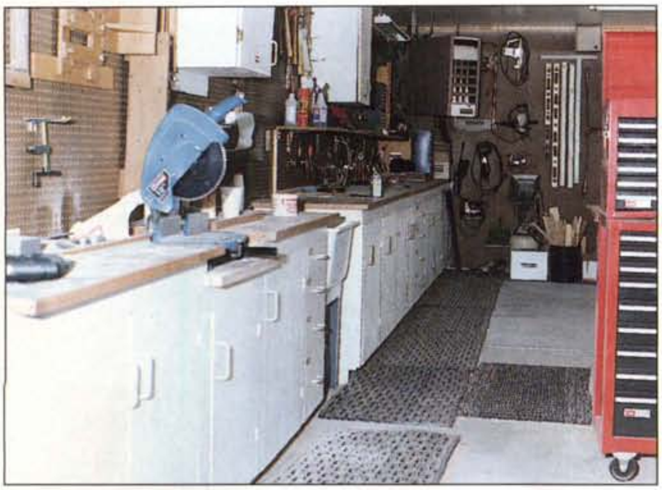
Standardize the size of the drawers so the only variable is the drawer height. I cut several dadoes inside the drawer box to allow dividers to be inserted when needed. A false drawer front makes the front flush. Allow ¼" space between the drawer fronts for clearance. A second drawer handle or cut–out on the drawer back allows you to carry the drawer easily to a job site.

The side panels of the base cabinets have only a ⅜" X ¾" dado cut for the cabinet bottom shelf. Drill the sides for movable shelf supports. I used a drilling template made of ¼" pegboard to obtain perfectly spaced holes. If the cabinet is located next to another cabinet, secure the two side panels to each other with glue and screws. Install a 1 X 4 (¾" X 3½") apron on the upper front edge continuing across the unit of cabinets to tie them together. Use dowels to attach a ¾" X 2" face frame. This facing will now be flush with the false drawer front. The cabinet doors can be made flush or with a ⅜" offset. For my flush doors I used inexpensive wrap–around hinges that offer more support than conventional hinges. If you go for the ⅜" offset door hinge, use the self–closing type and eliminate a door catch.

The bench top consists of ¾" X 24" plywood secured with glue and screws. Cover it with ¼" X 24" tempered hardboard to form a hard, smooth work surface fastened in the same manner. A front edging strip of hardwood measuring ¾" X 1" trims the edge and gives enough room for any clamping.

Wall Cabinets

Floor–to–ceiling cabinets utilize space efficiently, and can hide pipes or ducting. Use ¾" plywood for the sides and install a ¼" pegboard false back to cover the pipes and to create a storage area in front of them. Install the



At the end of the day, your feet will appreciate rubber floor mats.

pegboard and shelves so they're removable in case repairs are needed.

Safety

Keep these safety features in mind as you are planning your shop. Can you securely lock your shop or tools? Is the floor or immediate overhead area free of obstructions? Are you relying too much on extension cords? Is your electrical wiring adequate for the load and safely protected by fuses or circuit breakers? Are you using GFI circuits whenever reasonable and possible?

Be certain you have adequate ventilation; this will depend on your dust collection, the type of finishes you use, and whether you use power sprayers and welders in your shop. Store flammables according to manufacturers' recommendations. Install adequate fire extinguishers in appropriate locations and at all doorways. Don't forget the first aid kit.

Comfort Touches

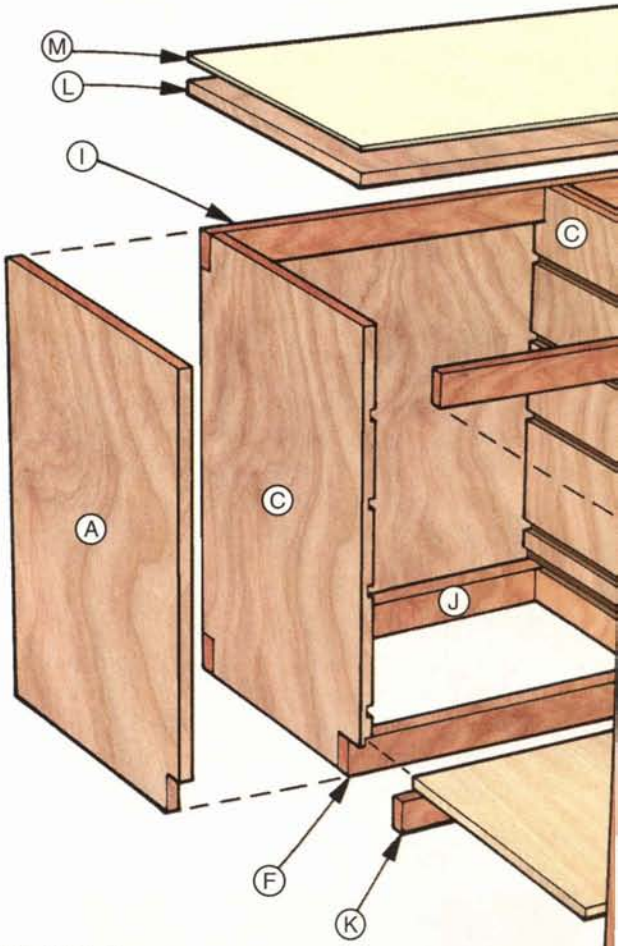
A lavatory is a nice convenience and so is a telephone extension, rigged with an attention light or loud horn. (On the other hand, maybe you want to get away from the telephone.) Other niceties include floor anti–fatigue mats, music, a coffee maker, or even a refrigerator (buy a new one for the kitchen and claim the old one for the shop). PW

I file all my tool manuals in loose-leaf ring binders for handy reference.

A wall–mounted telephone and intercom are a great convenience in any shop.

A small utility sink is useful in any shop setting.

Base Cabinet and Drawer



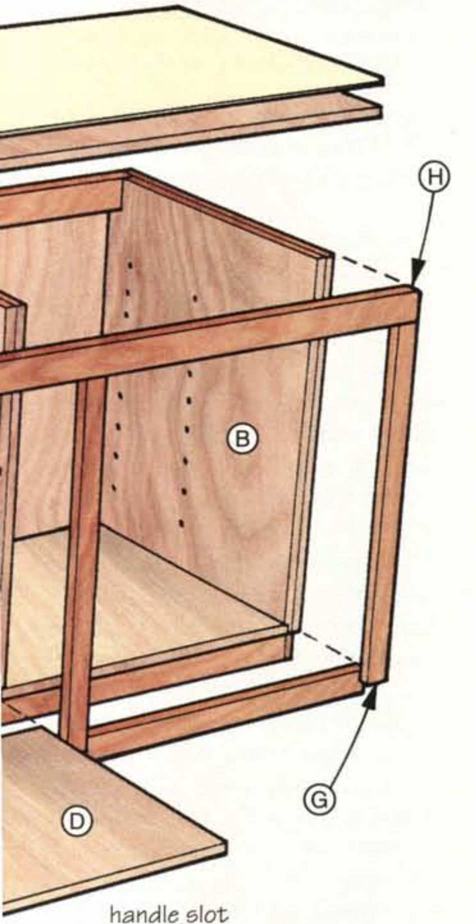
Shop Sources:

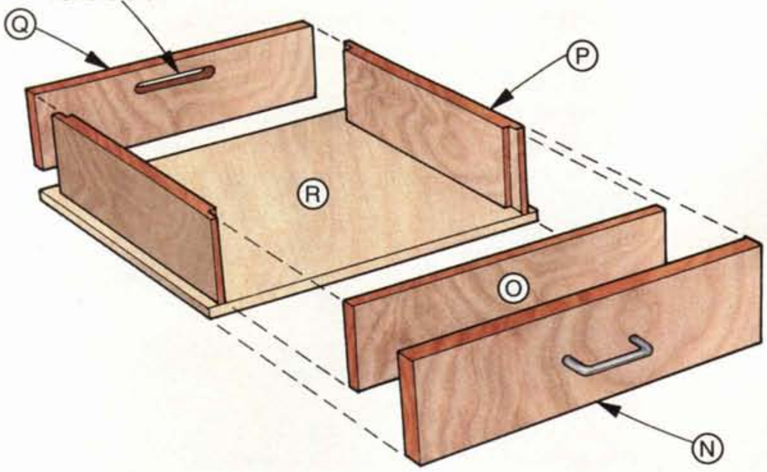
- Compressed air oiler, quick couplers, Re–Koil hoses, hose reels and auto drains—Northern Hydraulic Inc., PO Box 1499, Burnsville, MN 55337-0499. 800-533-5545
- Dust collectors/accessories, lumber wall brackets, casters, roller supports, mobile tool bases, self closing $^3/_8$" offset hinges—Woodworkers Supply, 5604 Alameda Place NE, Albuquerque, NM 87113. 800-645-9292
- Wrap–around hinges and dust collectors—The Woodworker's Store, 21801 Industrial Blvd., Roger, MN 55374-9514. 612-428-3200
- Telephone light/horn—Radio Shack, PO Box 2625, Ft. Worth, TX 76113.

The dadoes in the sides of the counter cabinets are easily cut with a router using one or two straight guides clamped to the work.

The drawer bottoms have an overhang that acts as a drawer glide fitting into a dado in the cabinet's side.

Wall cabinets store small parts such as screws and bolts at eye level for quick selection.





Cutting List					
Base Cabinet					
		Finished Size			
Qty	**Part**	**T**	**W**	**L**	**Piece**
1	A	¾"	22"	36"	end panel
1	B	¾"	22"	36"	shelf panel
2	C	¾"	22"	36"	drawer panels
2	D	¾"	22"	V	bottom shelves
8	E	¾"	12"	V	shelves
1	F	1½"	3½"	V	kick plate
3	G	¾"	2"	29"	stiles
1	H	¾"	2"	V	rail
1	I	1½"	3½"	V	back top support
1	J	1½"	3½"	V	back btm support
1	K	¾"	3½"	V	correcting strip
1	L	3/4"	24"	V	plywood top
1	M	¼"	24"	V	hardboard
Drawer					
1	N	¾"	V-Ht	16¾"	false front
1	O	2"	V-Ht	15½"	front
2	P	½"	V-Ht	20"	sides
1	Q	½"	V-Ht	15½"	back
1	R	⅜"	17"	21"	bottom
Wall Cabinet					
2	S	¾"	11¼"	36"	sides
2	T	¾"	11¼"	23¼"	top and bottom
1	U	¾"	21¾"	34⅞"	door (⅜" offset)
2	V	¾"	1½"	36"	stiles
2	W	¾"	1½"	21"	rails
2	X	¾"	8"	23¼"	shelves
1	Y	¾"	3"	24"	support hanger

V=Variable
V-Ht=Variable height of drawers

Stanley Tool Collectors Convene

by Sanford Wilk

Over 250 subscribers to the *Stanley Tool Collector News* honored The Stanley Works in Hartford, Connecticut, from June 17th through the 19th. With the awe and reverence of pilgrims bound for Mecca, they gathered near The Stanley Works for their first annual meeting. The convention was organized by *Stanley Tool Collector News* publisher, John Walter and convened for the three days to honor Stanley on its 150th anniversary. Stanley responded with an overwhelming expression of appreciation—gifts and awards to the exhibitors, VIP attendance at the convention and a speech at the exhibitors' banquet. John Walter invited the manufacturer to attend the convention. "The Stanley Works was very positive from the beginning," said Walter. "The subscribers are part of a growing association of Stanley Tool enthusiasts around the world who collect and use vintage Stanley tools, and The Stanley Works was very generous in their response to the group."

The Stanley Collectors' Convention was visited by VIPs, retirees and employees from The Stanley Works and its division, Stanley Tools. Stanley executives enthused over the displays while the collectors beamed. Stanley's new President and Chief Operating Officer Alan Hunter, addressed a rapt audience saying, "...the convention and the devotion of the collectors to Stanley is about as big an ego boost as a company can get." He continued with, "Talk about being a kid in a candy store. We think this is just terrific...it's a great show of pride in the quality of our products."

The collectors enjoyed a nonstop agenda including a dinner party on the beautiful grounds at of The Stanley Works headquarters. The tool collectors toured the hallowed halls of the 150–year–old company and then chatted on the lawn with Stanley Tools Division President, C. Stewart Gentsch, while the sizzle of BBQ, live entertainment and the conversation filled the perfect summer evening air.

The next day, the collectors returned the favor and hosted Stanley executives and employees on the convention floor. The collectors unabashedly showed off to an appreciative audience. Their enthusiasm and esteem were not lost on the folks from Stanley. "It's a very inspiring and humbling experience," said Stanley's public affairs spokeswoman Patricia McLean. The feelings were mutual all around.

At the collector's banquet, Carl Stoutenberg, Stanley's product line development manager and unofficial historian for the company, spoke on "Stanley Collectibles of the Future." Notepads came out in force as Mr. Stoutenberg let loose with stock numbers and manufacturing dates. Afterwards, each exhibitor was awarded a certificate of appreciation signed by Stanley Tools President, C. Stewart Gentsch, and given a specially made bevel from Stanley's Commemorative Products line of tools marking their 150th anniversary. John Walter was awarded a special plaque commissioned by the collectors thanking him for the excellent work he did in organizing the convention.

R. Alan Hunter (center), President and COO of The Stanley Works, admires Milton Bachellor's (left) display of Stanley marking gauges.

The tool enthusiasts traveled from as far away as Vancouver, Canada and Surrey, England. Nearly all 50 states were represented. They displayed over $1 million worth of antique and collectible tools. Trading on the floor among the dealers cruised full–tilt and many reported record sales.

"Obsession with Stanley is part of a growing appreciation for the value and usefulness of traditional tools," said Walter. Many at the convention were woodworkers, shop teachers, professional people and regular folks whose respect for their tools grew into an avid hobby of collecting vintage pieces. Tool collecting is gaining prominence, due in part to the excellent research and publications done in recent years by John Walter and others. Their efforts and enthusiasm fuel the public's interest and provide literature as a starting point for new collectors. John Walter's *Antique & Traditional Stanley Tools Guide to Identity & Value*, a 455 page reference work, has sold over 12,000 copies since 1991. It combines all known manufacturing data on virtually every tool Stanley made from the 1850s through the 1980s. The only book of its kind, it provides necessary information for dating and gauging the value of collectible Stanley tools.

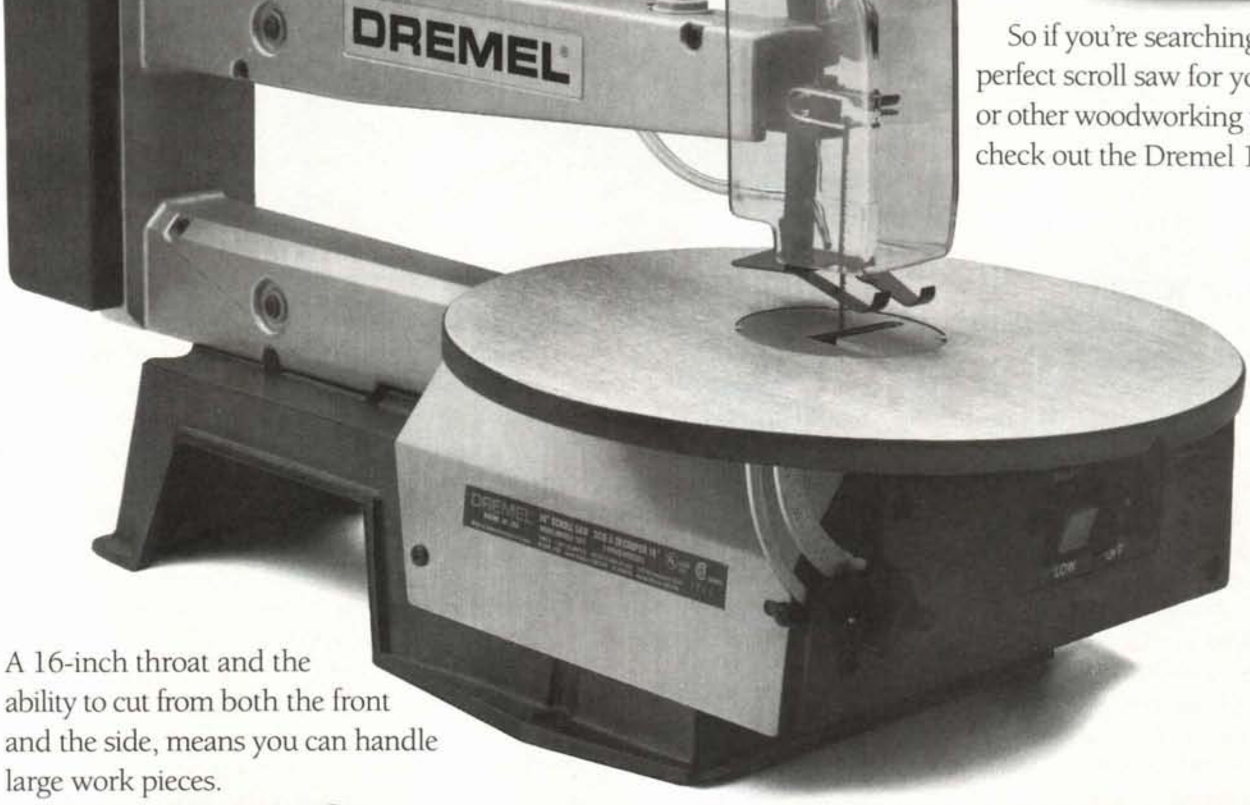
The find out more about collectible Stanley Tools and to subscribe to *The Stanley Tool Collector News* or to purchase Walter's book and other books on tools, contact John Walter at The Old Tool Shop, 208 Front St., Marietta, OH 45750. Or call 614-373-9973. Walter buys, sells and trades in all types of traditional tools and measuring instruments. PW

A good time was had by all.

What it takes to cut it as a Consumers Digest Best Buy.

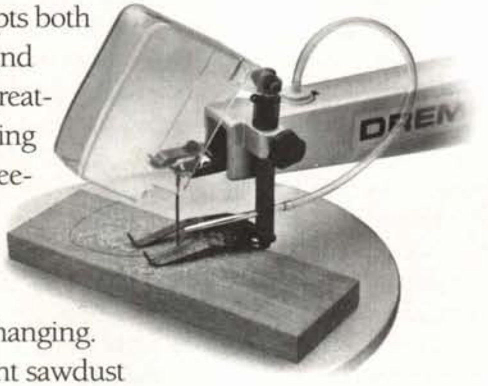
You don't get named a *Consumers Digest* Best Buy without working at it. You have to be an *outstanding* value. That's the Dremel 1671 Scroll Saw.

The Dremel 1671 has a lot of features that make it a pleasure to use. It has two cutting speeds and a powerful motor that lets you buzz through wood up to two inches thick, as well as sheet metals and plastics.



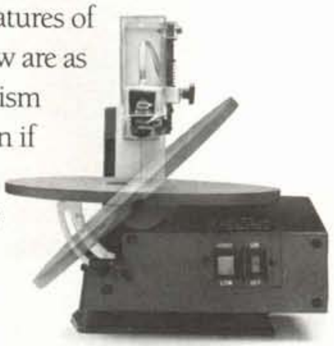
A 16-inch throat and the ability to cut from both the front and the side, means you can handle large work pieces.

The saw accepts both plain- and pin-end blades, for the greatest possible cutting versatility. The see-through blade guard pivots out of the way for easy blade changing. And a convenient sawdust blower keeps your cutting line clear for accurate cuts.



The sturdy, 12-inch cast aluminum table is adjustable from 0° to 45° for accurate bevel cuts up to 1-inch thick.

Of course, not all the features of the Dremel 1671 Scroll Saw are as obvious. A special mechanism quickly stops cutting action if the blade breaks. And the heavy cast-iron base keeps vibration to a minimum.



So if you're searching for the perfect scroll saw for your craft or other woodworking projects, check out the Dremel 1671.

And see why *Consumers Digest* placed it a cut above the rest.

For a free copy of the *Dremel Scroll Saw Blade Application Guide* write to:
Dremel, Dept. S-PW, P.O. Box 1468,
Racine, WI 53406-1468.

CONSUMERS
BEST BUY
DIGEST
DREMEL
1671
SCROLL SAW

DREMEL®

Incremental Positioning Jigs

Add Accuracy To Your Table Saw Or Router

by Roger W. Cliffe

Incremental positioning jigs add accuracy to many of those frustrating woodworking chores that would otherwise drive you crazy. When ripping consecutive strips, a positioning jig can be moved precisely and accurately to cut each strip. This allows you to cut the thin strip away from the fence and reduce the chance of kickback that's common when cutting narrow strips. These jigs really shine on your router table. With incremental fence movement, joinery can be cut easily and then repeated with dependable accuracy.

The secret is in the positioning mechanism. Jointech's mechanism uses the lead screw principle. The lead screw has 32 threads per inch (tpi). Each revolution of the lead screw moves the fence exactly 1/32". In addition to the lead screw, there's a thumbwheel for micro–positioning. The thumbwheel has detents for positioning at .002"—each click represents two thousandths. For coarse movement, push the button control on top of the device and the lead screw is released. Roller bearings in the carriage make movement easy. Once the fence is in position, release the button and the fence is locked in place. There's an optical window on the top of the jig. The cursor can be zeroed to the fence with the measuring template or any of the joinery templates. This allows for fast, accurate and convenient setup.

The Positioning Jig and Accessories

You can attach the jig to a piece of plywood and then clamp it to your router table or mount it directly to the table saw. The fence is an aluminum extrusion, with a dovetail opening along the top edge to accommodate a stop block and push fixture. It's attached to the end of an extruded aluminum housing. The stop block controls depth of cut and the push block allows control of the stock in the vertical position. There's also a featherboard that can be positioned in the dovetail opening. The featherboard works as a hold down and control device to make operations safer.

Templates are included which are inserted into the base to help you position the fence for various types of joinery such as dovetails, box joints and other exotic double inlay joints. Most joinery requires only one or two easy setups. The jig also assures symmetry with a variety of different board widths.

There are special templates which assist you to make through dovetails. The size of the dovetails that can be cut range from 1/4" through 13/16". The through dovetail procedure requires only one dovetail bit and one height setting. Many through dovetail systems require two bits—one straight bit and one dovetail bit. Extra bits mean extra setup time and perhaps the need for another router.

There's another positioning jig that has a split fence. The split fence allows you to offset the fences for jointing or joinery operations. If you wanted to joint a piece of particle board, you wouldn't use your jointer because the steel

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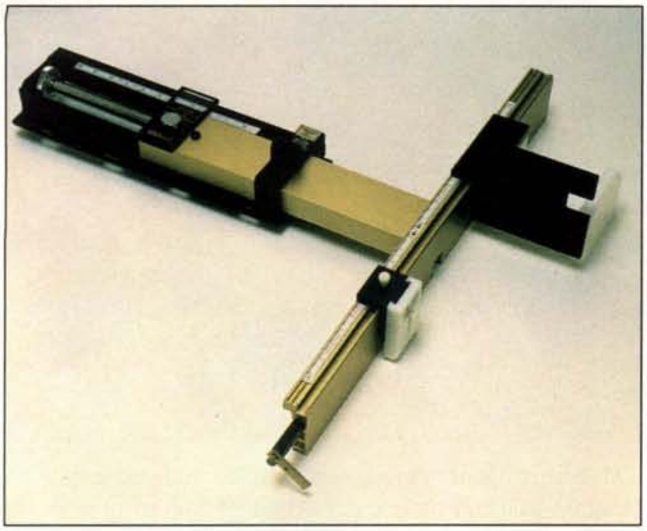
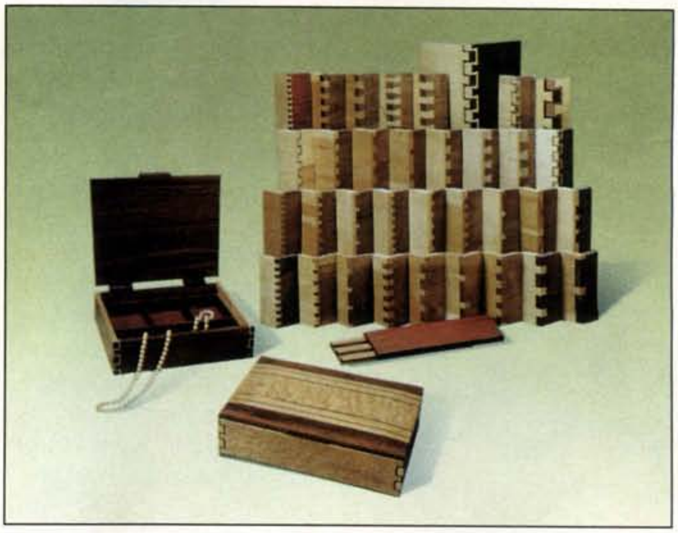
__Roger Cliffe__ is a noted woodworking teacher, lecturer and author from Dekalb, Illinois.





knives will dull with one pass. By using offset fences on the router table, you can joint the edge with a carbide bit.

This jointing operation is also useful to eliminate saw marks from the edges of boards. If you're cutting joinery such as cope and stick joints (rail and stile), glue joints or tongue and groove joints, you get better results by offsetting the fences. The bit machines away any saw marks and leaves a perfect–fitting joint. It gives you many qualities of a shaper without the increased tool and tooling cost. Each side of the split fence is independently adjustable. There's a micro–adjustment feature that allows precise setups with little effort.

There are plastic inserts that attach to the fence. The inserts can be cut to match any router bit profile up to 4" in diameter and 2" high. They accommodate even the large raised panel bits designed to be used in a router. By trimming the insert to match the bit, the cut is smoother and you have greater control over the work. It's difficult for a bit to pull the corner of the work into a small opening—a large opening can lend itself to a kickback.

Built–in dust collection is a must. A standard shop vacuum hose can be mounted to the outfeed end of the fence. The collector pulls all the chips away from the bit. The chips get cut only once by the bit—cutting the same chip over and over causes premature dulling. Plastic inserts also increase the efficiency of dust collectors. The increased suction caused by the close tolerance between insert and bit diverts the chips into the collection fence.

There are T–slots in the front of the fence to attach other auxiliary fences. An example would be a tall fence to use with a vertical panel raising bit. The height of the auxiliary fence can be much taller than the extruded fence to hold the panels perpendicular to the bit during routing for more control over the operation and to keep your hands a little further from the bit.

Common Uses

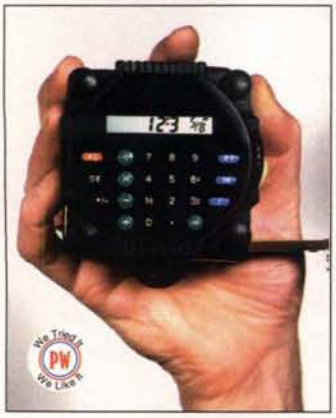
You can obtain precision rips when you use the jig on a table saw. You can use the fence to locate and position stock for repetitive cuts or when cutting lap joints, rabbet joints, and mortise and tenon joints.

When used on a router table, the types of joinery you can cut include: half blind dovetails, sliding dovetails, through dovetails, and box joints of various sizes. Incremental positioning jigs also work well for end and edge joinery such as the lock miter, drawer corner, glue joint, tongue and groove, rabbet, and cope and stick. It can also be used to joint edges by offsetting the fences and using a straight cutter. It will also accommodate vertical panel raising bits up to two inches high, and horizontal panel raising bits up to four inches in diameter.

When buying an incremental positioning jig inspect the manual carefully. Make sure it provides clear, concise instructions for the type of joinery you intend to use it for. When you get the jig home and set up, read the manual thoroughly and observe all the safety rules, so you'll get positive results right from the start. PW

News and Notes

New products to announce? Send a press release and a color photograph to the Editor, *Popular Woodworking*, 1041 Shary Circle, Concord, CA 94518, and we'll consider them for "News and Notes."



Tape Mate™ attaches to any Stanley Powerlock® rule over 20'. It calculates in fractions or decimals and figures areas and volumes automatically. Solar powered and dustproof, the calculator snaps out of its holder, fits in a pocket or replace it face down for protection. DigiTool Corp., 414 N. Mill Street, Aspen, CO 81611. Tel. 303-925-8177.

Delta's new 6" Variable Speed Bench Jointer has a speed range of 6000 to 10,000 rpm with a 10–amp motor. The tilting, center–mounted fence makes bevel jointing and camfering a snap with positive stops at 45° and 90°. It comes with push blocks, a chip chute and a two year warranty. Tel. 800-438-2486.

Coming in September '93, Black & Decker's new power tool line, Quantum, is designed to meet the needs of increasingly skilled do–it–yourselfers (DIYers). These new high–performance tools have greater power and advanced product features. The line includes the first DIY circular saw with built–in dust collection.

Modern Options' Patina Antiquing Kit lets you create an authentic oxidized patina, not a faux finish, on almost any surface. On brass, copper or bronze pieces use Patina Green directly; on other surfaces like wood or ceramic, use Copper Topper first then the patina—or leave it copper if you like. The kit includes everything you need including latex gloves, brushes, metal cleaner and primer/sealer. Available in other colors and metals from Modern Options, 2325 Third Street #330, San Francisco, CA 94107. Tel. 415-252-5599.

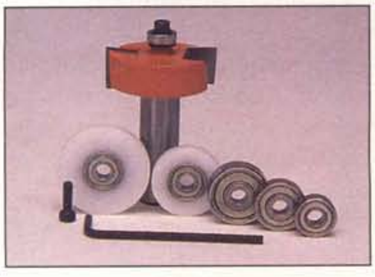
The AIRLITE is a lightweight "Air Visor" that offers face and eye protection as well as a continuous flow of filtered air. Weighing less than 1¼ lb with an air flow of 7 ft^3/min, the visor remains fog free. Complete with 4 hour on board rechargeable battery or 8 hour rechargeable belt—charger included. Airstream Dust Helmets, P.O. Box 975, Elbow Lake, MN 56531. Tel. 800-328-1792.

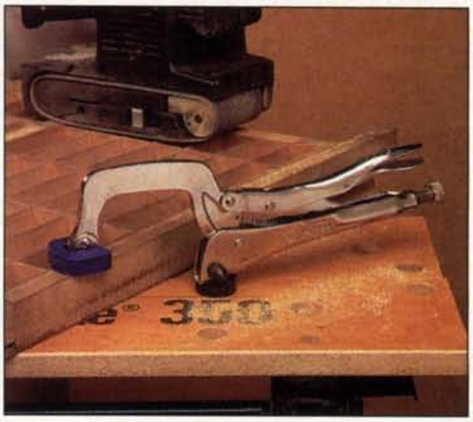
Plano makes 20 all–plastic toolboxes and storage organizers so handy and strong they're guaranteed for life. For large tools, there's a 2500 in^3 model with a lift–out tray. Plano Molding Company, 431 East South Street, Plano, IL 60545. Tel. 708-552-3111.

The Tramex Wood Moisture Encounter provides an instant, accurate and non–destructive method of moisture measurement for wood and wood products without having to scratch or damage the surface. Battery powered, the unit works by sending parallel low frequency sound waves up to 1" into the wood—even through the finish. Tramex, P.O. Box 1761, F.D.R. Station, New York, NY 10150. Tel. 011-353-128-23688 (Ireland).

Ryobi engineers have developed an innovative blade control devise for their new RA202 8¼" Bench Top Radial Arm Saw. Control Cut™ regulates the speed of blade advance into the work from 0 to 32 fpm. The system eliminates blade creep and uncontrolled saw head advance. When the trigger is released, the saw head automatically retracts. The RA202 is powered by a 12.5 amp motor for a 5000 rpm blade speed. For nearby dealers call 800-525-2579.

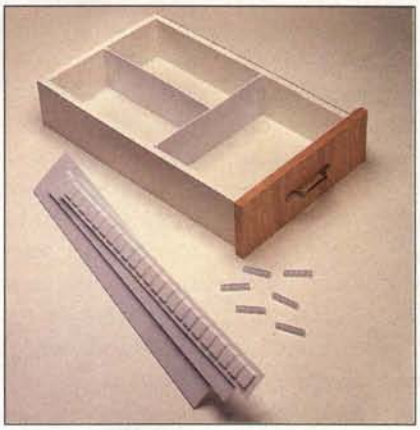
The Rabbet–Master Kit cuts six commonly used rabbets for the price of a single bit. Six bearings adjust the cut depth to ⅛", ¼", 5⁄16", ⅜", 7⁄16" or ½". The bit features anti–kickback design and micrograin carbide. CMT Tools, 5425 Beaumont Center Blvd., Suite 900, Tampa, FL 33634. Tel. 813-886-1819.





The new VISE–GRIP® locking hold–down clamp offers maximum clamping power for drilling tables, workbenches and other work surfaces without the need for constant repositioning. The cantilevered handle design reduces the need for frequent readjustment. With 900 lb of clamping pressure, the work stays firmly in place. Removable soft pads on the jaws protect delicate materials and fine finishes. American Tool Companies, Inc., Box 337, DeWitt, NE 68341. Tel. 402-683-2315.

Customized drawer dividers come as easy–to–clean plastic strips that can be scored with a utility knife and snapped into pieces of any length. Self–adhesive holders are included for supporting the dividers in the drawer in any configuration you design. Available through The Woodworkers' Store, 21801 Industrial Blvd., Rogers, MN 55374. Tel. 612-428-3200.



Senco Products, Inc., has introduced a new line of oil–less compressors manufactured by Thomas Industries. The single tank, ¾ hp Turbo HotDog II® delivers 2.12 cfm at 100 psi. The 1½ hp, 65 lb Twin Turbo HotDog™ delivers 4.5 cfm, while the 1½ hp, 92 lb Twin Turbo Force™ pumps out 5 cfm, both at 100 psi. Tank volumes are 4 gal and 7 gal. For information contact Senco Products, Inc., 8485 Broadwell Road, Cincinnati, OH 45244. Tel. 800-543-4596.

by Sanford Wilk

Circular Saws

I've used sidewinders in many workshops, but I have one at home that's been a favorite for many years. It's the saw that I remember watching my grandfather use when I was a boy. It served me well for years after I inherited it, but sadly, it's time to replace it. Not having purchased a saw in several years, I was a bit overwhelmed when I started looking for a replacement. This isn't surprising when you consider the number of companies competing for a share of this $200–million–a–year business. After doing some research on the components and features that go into a circular saw and with some input from associates, this is what I've found.

The saws reviewed here are professional duty. The DIY (do–it–yourself) saws sell for a third the price of the ones we tested. The reason the saws in this review are more expensive is because they're designed for heavy–duty use. Circular saws under constant use can't allow heat to build up in the windings and dust must not be allowed to collect in the switch. Professional duty saws use ball bearings rather than sleeve bearings for longer life. A good analogy between the DIY saw and the professional duty saw is to compare a sports car with a Formula 1 racer. Both cars look good, can go very fast and both handle well, but the sports car is for the person who wants the driving experience; the racer is for the person whose livelihood depends on its performance.

Anatomy Of A Sidewinder

Motor

All the saws reviewed here are powered by a "Universal Motor." This motor gets its name from being able to run over a wide range of frequencies as well as direct current (DC). Not all saws work with DC. It's best to check the owner's manual and the nameplate on the motor to see if the saw has this capability. Claims of power output in horse power (hp) can be exaggerated, so the best way to judge the output is to check the rated amperes. This information can also be found in the user's manual and on the motor plate.

An electric brake is available on many of the saws that we tested. The brake stops the blade in two seconds or less when the trigger's released. This happens either by reversing the polarity on the primary windings of the motor, or energizing a separate coil that tries to turn the motor in reverse. One negative associated with electric braking is reduced commutator brush life. Brush contact is the weakest link in the motor—they spark when the brake is applied and this results in extra wear. When the brushes become worn, they have to be replaced. It's better to replace them sooner than later—if you wait too long, you may end up replacing more than just the brushes. Since it's important to check the brushes regularly, it's more convenient to have them accessible on the outside of the case instead of having to remove the motor housing to get at them.

Handle

The other characterizing feature of a saw is the type of handle. Handles fall into two categories: the push handle and the top handle. Hitachi markets a hybrid version. Each type of handle has its merits and the choice between the two is generally one of personal preference or the type of work being performed. Often both types are found at job sites.

The push handle gets its name from the location and the motion that's most comfortable for cutting. When standing behind the saw, the forearm is almost parallel with the work surface. This makes the push handle easier to control on long reaches such as cutting a 4 X 8 sheet of plywood on a saw horse. The location of a push handle provides a longer reach than top handled saws. The drawback of the push handle design arises when working from above the saw. This is particularly evident when making pocket (plunge) cuts. If the cut is very shallow and the saw is equipped with a pivot foot, the push handle acts like a top handle—leaving the handle in an awkward position for this type of cut.

Base

The base of the saw (also referred to as the foot or shoe) is a broad plate that glides across the top of the work surface. It's analogous to the table of a table saw. The base of the saw must be durable. If it's bent, spindled or mutilated, it may not provide a stable platform and the blade can bind in the kerf. Bases are made from a variety of materials—from stamped steel to cast aluminum alloy. The base on most of the saws we tested was aluminum plate. The base is attached to the bevel adjustment mechanism. On pivot foot saws it's attached to the depth control mechanism. Having the base attached

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***Sanford Wilk**, a builder and organic architect in Boston, Massachusetts, heads a team of craftsmen who evaluate tools under actual working conditions.*

by screws instead of rivets is preferred because rivets make replacing a damaged base much more difficult.

The leading edge of the base should be raised to form a lip. The lip allows the base to glide smoothly over rough surfaces. Some of the saws, particularly the drop foot models, have this up–curved lip only on the left of the blade, which is the majority of the width of the base.

Depth Adjustment

There are two kinds of depth adjustments on circular saws. The drop foot (also referred to as the parallel shoe or vertical adjust) and the pivot foot. The drop foot has a vertical support that rises from the base (usually attached to the bevel) and mates with a vertical surface on the front of the motor. The surfaces slide to allow positioning of the blade through the slot. The base is held in position by tightening a knob located on the front of the saw. A couple of advantages of drop foot saws are the ease of access to the depth adjustment; and the handle, though higher off the work, doesn't rotate when the saw is set for shallow cuts.

On a pivot foot saw, the base is attached to the bevel adjust at a single point in the front of the saw. The foot rotates around the pivot and is locked in place by tightening a knob located in the rear of the saw between the handle and the upper blade guard. Because the pivot foot is attached to the foot at three points—two in front and one in the rear—it has a more secure feel than the drop foot which is cantilevered off the vertical adjust. It is, however, this rear support, and more specifically its locking lever, that's the greatest drawback to the pivot foot design.

The lever is located either between the upper blade guard and the handle, or on the outside of the handle. When the lever is located between the guard and the handle—it's difficult to access if you have large hands. If the handle and the guard are too close together, nearly everyone will have trouble reaching it. When the lever is located on the far side of the handle it's awkward to tighten.

One advantage the pivot base has over the drop foot is that the cut indicator is also accurate for a 45° bevel. This is because the front of the foot remains in the same relative position to the blade as the depth is set. On a drop foot saw with the blade set at an angle, the line of cut shifts to the right or left as the blade is raised or lowered.

The depth gauge is easier to read on the pivot foot. On the drop foot the graduations are on the vertical sliding mechanism in a 1 to 1 relationship between depth and scale. The pivot foot has a magnified scale because the pointer is turning on an arc that is further away from the center of the blade. This gives a more precise scale and allows more accurate depth settings.

Bevel

The bevel allows the saw to cut at an angle in a similar fashion to a tilting arbor saw. The bevel is set by loosening a knob and pivoting the foot to the desired angle. The angle reads off the scale that is part of the bevel mechanism. The precision of the scale varies from manufacturer to manufacturer. Some bevels have graduations every 5° while some manufacturers have graduations every degree. Numerical labeling of the graduations ranges from every 5° to none. Although this doesn't affect the operation of the saw, it does affect the ease of set up.

The bevel adjustment knob on some saws can be difficult to access. This is a particular problem on some drop foot saws when the depth adjustment knob is located directly above the bevel adjustment knob. When a drop foot saw is set for maximum depth, the depth adjustment knob blocks access to the bevel adjustment knob. This means you have to get your hand between the foot and the depth adjustment knob.

Lower Guard

The lower guard encloses the blade above the foot at the rear of the saw not covered by the upper guard, and when the blade is not in the work, the portion below the foot. The guard is spring loaded to snap back into place when the saw is removed from the kerf.

Safety Rules

1. Always disconnect saw from power before performing any service.
2. Always wear safety glasses.
3. Always hold the saw with two hands, one on the handle and one on the front grip.
4. Always support the work on both sides of the cut. Failure to do so can cause kickbacks if the work sags or twists and the blade binds in the kerf.
5. Always position the saw so the motor is over the broadest portion of the work.
6. Keep work areas clean.
7. Don't use electrical equipment in a wet environment.
8. Remove adjustment tools and wrenches.
9. Never overreach.
10. Avoid cutting nails.
11. Always be aware of the section of the blade not covered by the blade guards.
12. Use a sharp carbide blade to reduce the tendency for kickbacks.
13. Never hold work in your hands nor use your legs or feet for support.
14. Use caution when making pocket cuts into blind areas (i.e. walls) because wires, pipes or other objects may be present and can cause a kickback.
15. Be sure that the lower guard has returned to its closed position before putting the saw down.
16. Wear proper clothing so nothing can snag or catch in the saw or on the work.

Guard Lever

There are times when manual retraction of the lower blade guard is necessary. Making pocket cuts is a good example. A lever is provided to move the guard out of the way before turning on the saw. It is released when the foot is firmly on the work surface.

This eliminates the need for the unsafe practice of blocking the lower guard in the open position.

The lever is located at the rear of the saw to the outside of the upper guard. It's attached to the lower guard and is operated by moving it forward, grasping the front handle and using the thumb to prevent the lever and the lower guard from returning to the closed position.

In addition to the gaurd lever, Skil and Bosch have a second method of retracting the lower guard. Located between the handle and the upper guard there's a lever that's connected to the lower guard by a linkage that raises the guard when the lever is raised. We really like this idea since it allows the user to keep both hands on the protected side of the upper guard. The one problem is that it can't be operated with both hands on the handles.

Chip Exhaust

Chips fly everywhere—into your face on a long reach and all over the floor like slippery leaves on wet pavement. Most of the saws we tested have a dust chute on the upper guard that forces the chips off to the side. One offers a dust bag and others allowed for vacuum attachment.

Rip Fence

All the saws we tested have a slot for a ripping guide. The slot is manufactured in one of two ways; it's either stamped into the base or machined out of the bevel bracket. The fence is a T–shaped bracket that's inserted into the slot and is positioned so that the distance between the outside of the blade and the inside of the fence is the same as the desired width. It's held in place with a thumbscrew. The ripping fence is typically an accessory.

The fence is not like the rip fence on a table saw. The table saw fence is much longer and provides a reference surface for making long straight cuts that are suitable for butt joining. The fence on a sidewinder is more like a guide to keep the width fairly constant.

Weight

Saw weight is a function of the materials used to manufacture and assemble it. Manufacturers make trade–offs in the design and choice of materials when developing a saw. It's possible to make a saw that cuts through the toughest materials with accuracy and is virtually indestructible—the problem is the saw would look like a table saw with a handle.

Changing Blades

To change a blade on a sidewinder, the spindle must be kept from turning so the retaining bolt can be loosened. This isn't done all that often, however, when a blade is changed it's usually a pain in the knuckles. There are three methods used to capture the spindle: blocking, jackshaft wrenches or a spindle lock. The first thing to do before changing any saw blade is *Unplug The Tool.*

Blocking is placing a piece of wood or a screwdriver on the base and in the gullet (cup between the teeth) of the blade. If metal is used be sure it doesn't touch the teeth of the blade. I've seen saws with a hole in the upper guard to facilitate this, however, none of the models we tested had this feature. Blocking is also done by lifting the bottom guard, placing the saw on a block of wood and pressing down to dig the teeth into the wood. With jackshaft wrenches, one wrench holds the spindle in place and the other loosens the retaining bolt.

Spindle Lock

Today, most manufacturers offer models with a spindle lock. The spindle lock is a spring loaded button that lines up with a slot in the spindle when depressed. To engage the spindle lock, depress the button and turn the blade by hand until the lock engages. When depressed and in the slot, the spindle can't rotate and the wrench can then be used to loosen the bolt.

All the models we evaluated had this feature. The button is located between the upper blade guard and the handle. Its exact location varied between manufacturers. I found that having the button on top of the gear housing was the easiest for me because of how I hold a saw when changing a blade. The location I liked least was on the back of the gear housing near the depth adjustment lever. Here you run into the same problem you have setting the depth on a pivot foot—insufficient access.

Blade Wrench

Although not required to operate the saw, it's convenient to have the blade wrench accessible when needed. This eliminates fumbling through a toolbox or the back of your truck when the string holding it to the cord breaks. (One good feature of tying the wrench to a string at the plug is it serves as a reminder to unplug the cord before changing the blade.) Three of the models we looked at provided a place to store the wrench. Bosch and Skil have a slot in the handle that holds the wrench firmly in place and keeps it out of the way. The Sears model wedged the wrench in a slot in the stamped steel foot leaving the wrench trailing out the back like a tail. It doesn't affect the operation of the saw, however, it could get snagged and accidentally lost.

General Cutting

Using The Saw

When using these saws, one hand should always be on the handle and the other on the front palm grip. Line up the cut with the alignment notch (when applicable) and the saw blade. Back the saw away from the work, so the blade can turn freely when starting, and pull the trigger switch. Move the saw into the work and along the cut line with a light and continuous pressure. Never force the saw.

Pocket Cuts

After disconnecting the saw from the power source, set the depth to the material being cut. Align the saw with the line of cut. Using the lip as a pivot point, raise the lower guard, pull the switch and slowly lower the blade into the work. Once the foot of the saw is firmly on the work, move the saw forward until the end of the cut is reached. Be certain the blade has stopped before lifting the saw out of the cut or you may have a kickback.

Large Sheets

The size of large sheets, such as a 4 x 8 sheet of plywood, gives them a tendency to bend if not properly supported. Bending can cause the kerf to close, leading to blade binding and kickback.

Always support your work piece so it won't bend and bind the blade after the cut is made.

Kickbacks

Sometimes the blade can get pinched in the kerf. This can be caused by the work, the saw being improperly supported or the blade getting misaligned in the kerf. This can cause the teeth on the trailing edge of the blade to catch the top surface of the work. When this happens, the blade climbs out of the cut and the saw is propelled backward towards the operator.

Kickbacks can also occur when stresses in the wood cause the wood to twist or bend, closing the kerf. The effect of binding can be made worse by setting the depth of cut too deep. This puts more blade into the cut with more surface area and friction. Try to always maintain a good grip and know where your blade is headed.

Bosch 1655

Bosch and Skil have merged into the S–B Power Tool Company. Skil had the better saw, so Bosch has chosen to use Skil's model 5657 and put their name on it. Here, the added benefit is Bosch's service centers.

DeWALT DW364

Everyone we showed this model to loved it. It looks like the folks at DeWALT have been listening to the complaints from users as well as coming up with a few innovations of their own. The first thing you notice is the unique depth of cut adjustment. It's a hybrid of the drop foot and the pivot foot designs. The pivot's in the rear and the vertical support is arched to accommodate the pivot. The depth adjustment knob is large and positioned high enough so it doesn't impede reaching in to adjust the bevel. Setting the bevel on this saw couldn't be easier. The large, easy to read scale is graduated every degree up to 50°. The DW364 is a modular design. If you need to replace the upper guard that broke when the saw was dropped off a roof, you won't have to buy the whole gear housing. This lowers the cost of repairs and while your unit is being fixed, DeWALT will give you a loaner. The only thing we didn't like was the scale for depth of cut. Although the scale is large, easy to read, has an adjustable pointer, it's a decal and subject to wear.

Hitachi C7BD

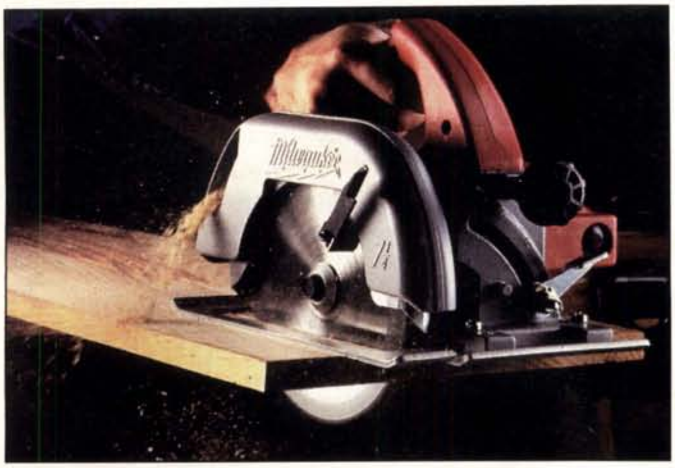
The Hitachi is a heavyweight saw that's in the ring as a light weight. Weighing in at a mere 10 lb 3 oz, it's one of the lightest saws we've seen in this class. But this lightweight saw is no pushover. This weight, or lack thereof, makes cutting off rafter tails from a ladder a much less painful experience.

It's a pivot foot saw with a very comfortable handle. It's a hybrid between the push and top handle designs. There's a good sized knob built into the front of the handle for additional control. The base on the saw is a ribbed casting for exceptional strength while not adding weight to the saw. This was demonstrated when the saw was accidentally dropped from a single story roof. This was done by trained professionals—do not try this at home. Another feature that will be appreciated, not only by the craftsman but the fussy homeowner, is the ability to hook a vacuum attachment up to the saw for work in dust sensitive environments.

Our only complaint is that access to the depth adjusting lever is hampered by the upper guard and handle. Large hands may not be able to set the depth as quickly as they may like, however, the time lost will be more than made up at the end of the day when the user has had about two fewer pounds to push.

Makita 5007NB–A

The top of the line saw from Makita features an electric brake wound as a separate coil. It results in faster and sharper stops. The aluminum shoe and compact size helps keep the weight under 12 lb. The compact size, however, does have a



few drawbacks. Setting the depth of cut means more fumbling with the depth adjustment than is usual for a pivot foot. When you grasp the front palm grip you're likely to scrape your knuckles on the bevel gauge. The bevel gauge is marked at 5° increments, but numbered every 15°. The front palm grip also gets in the way when trying to access the spindle lock. Overall we found this saw to be best suited for a user with small hands. For the top of the line saw from Makita we expected a little better. But, this doesn't prevent it from being one of the most popular saws on the market today.

Milwaukee 6369

The Milwaukee line hasn't changed much over the years, but when you have a rugged, long–lasting tool with ample power, what would you change? The 6369 is the time tested 6366 with the addition of an electric brake. Like its predecessor, it features steady power and tough construction. The aluminum parts are well machined and it's the only drop foot we looked at that also has a lip to the right of the blade. User maintenance is enhanced with surface accessible brushes and a foot that's screwed on instead of riveted. Things we would like to see are easier to read scales on the depth and bevel gauge, and a larger spindle lock button in a more convenient location. These few faults, however, are not enough to keep us from liking the saw. If you're looking for a saw that'll take a lot of abuse and last, the Milwaukee is one to consider.

Porter–Cable 447

Porter–Cable sidewinders have been a perennial favorite, even models without a spindle lock or surface accessible brushes. But the designers at P–C have been listening. They countered, "We'll see your spindle lock and accessible brushes and raise you a 15 amp motor, magnesium and reinforced resin construction and a dust bag." We were skeptical about the dust bag getting in the way until we tried it. After a few cuts the only thing we noticed was the lack of dust. The saw is also available without an electric brake as Model 347.

Ryobi W–660C

The W–660C is a DIY saw with professional features. The base is made from stamped steel, making it a candidate to bend if it's dropped. It does not have an electric brake so the blade takes a bit longer to come to a complete stop. It has a homeowner type trigger lock—and another feature not typically found on a DIY saw—a 13 amp motor with ball and roller bearings.

Sears 27542

The 27542 is one of the biggest circular saws we evaluated—but bigger is not necessarily better. The bevel bracket is stamped out of the foot and leaves a large gap that can hang up on rough surfaces as the saw is pushed along. The bevel gauge is marked in 5° increments from 0° to 45°. One good thing about the size of this saw is that it's a better fit for those with larger hands. There's also ample room to get even the biggest thumb on the depth adjustment lever. Sears includes a rip fence as standard equipment. PW

Circular Saw Test Results

	Bosch 1655	DeWALT DW364	Hitachi C7BD	Makita 5007NB–A	Milwaukee 6369	Porter–Cable 447	Ryobi W–660	Sears 27542	Skil 5657
Handle Design	Push	Push	Hybrid	Push	Push	Push	Push	Push	Push
Type of Base	Aluminum	Aluminum	Aluminum (cast)[1]	Aluminum	Aluminum	Magnesium Alloy	Stamped Steel	Stamped Steel	Aluminum
Depth adj. Method	Pivot	Hybrid	Pivot	Pivot	Drop	Pivot	Pivot	Pivot	Pivot
Maximum rpm	5500	5800	5400	5800	5800	5800	5000	5000	5500
Electric Brake	No	Yes	Yes	Yes	Yes	Yes	No	No	No
Weight (lb)	11.75	12.8	10.33	11	10.9	11.25	9.6	12.75	12.4
Surface–access To Brushes	No	Yes	Yes	Yes	Yes	Yes	No	No	No
Amperage	13	13	13	13	13	15	13	13	13
Capacity (45°)	1 7/16"[2]	1 7/8"[2]	1 27/32"	1 3/4"	2"	1 13/16"[3]	1 3/4"	1 3/4"	1 7/16"[2]
Capacity (90°)	2 7/16"	2 7/16"	2 3/8"	2 3/8"	2 7/16"	2 5/16"	2 5/16"	2 1/4"	2 7/16"
Spindle Lock	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
List Price	$214	$275	$239	$255	$259	N/A	$184	$110[4]	$205
Rating	9	10	9.5	8	8.5	9	6.5	7	9

[1] Bases are cast aluminum with reinforcing ribs
[2] Capacity at 50
[3] Capacity at 48°
[4] Selling Price

Skil 5657

The current offering from Skil is hot. The 5657 is a push handle that is well balanced and is a pleasure to hold. It features a machined aluminum foot and a 50° bevel capacity for complex miters. There's a slot for the blade wrench, an optional vacuum attachment for dust sensitive environments and it comes with a Razor's Edge™ blade with Dyanite™ carbide. But what else would you expect from the people that invented the circular saw, a 30 day money back guarantee? That's offered too.

When reviewing power tools we put a lot of weight on safety features. The Skill 5657 features a patented remote lower guard lift that allows you to raise the lower guard without getting your fingers near the blade. Too bad it's patented, because it could save countless injuries each year if everyone incorporated it into their saws. We have no doubt that it's one of the reasons that Bosch decided to market it. PW

Wood Books for the Holidays

by Ken Textor

In the years that I've been writing this column, many readers have written to ask me for more specifics. How do I identify the different trees? What's meant by interlocked grain? Can a wood's hardness be quantified? What woods are comparable with others—what kinds of substitutions can I make?

As the holiday season approaches, the editors and I thought it would be a good idea to suggest some sources to help readers find more answers to their "Wood Types" questions. The following are some of the books I have on hand to keep me abreast of the endlessly fascinating world of wood types. (Here's a hint: You may want to leave a highlighted version of this list where holiday gift buyers will see it!)

A Field Guide to Trees and Shrubs by George Petrides, ©1958, second edition 1986, Houghton Mifflin Company, Boston, MA.

If you can't tell an oak from a maple, sassafras from sycamore, elm from alder, this book is a must. Nearly all major species found east of the Rockies are showcased here.

This book offers a lot of pictures and information to help you identify exactly what type of tree you're looking at. Carefully drawn sketches of leaves, twigs, buds and the entire tree's silhouette also aid in identification. The book has information on where the tree commonly grows (bottom land, uplands, etc.) as well as its range (East Texas, Atlantic Coast, etc.). Minor species outside the book's designated area of coverage are omitted. For instance, you won't find mesquite in this book, although cottonwood, cypress and other Southern trees are included.

Red Oaks & Black Birches: The Science and Lore of Trees by Rebecca Rupp, ©1990, Storey Communications, Pownal, VT.

The next time someone wants you to make a walnut cabinet, ask them if they'd like pickled walnuts to go in it. Or how about those legends of virility–stirring sassafras tea? Or lightning always striking oaks? Or the connection between birch and fascists?

In this fascinating array of anecdotes, Dr. Rupp has pulled together a collection of solid information from the hidden side of trees and their by–product, wood. This information won't necessarily make you a better woodworker, but it just might make you a more interesting one.

Of all the books listed here, this is the easiest to just sit down and read. It is divided into chapters by species—apples to willows—and all of the major North American species in between. A handy index is included.

Understanding Wood by R. Bruce Hoadley, ©1980, seventh printing 1990, Taunton Press Inc., Newtown, CT.

This book gets up close and personal with various wood species. Hoadley takes you on a detailed journey from wood cell structure to grain analysis, and from moisture content to fastening failures. If you have a question about how wood works, the answer is probably here. But this isn't some dry academic treatise. Although Hoadley is a professor at the University of Massachusetts, he writes clearly and simply. Sketches and illustrations help the reader visualize what he's describing as he always has the woodworker in mind. Indeed, as some of the pictures show, he's a pretty good woodworker and sculptor in his own right.

All of the graphics are top–notch. Hoadley not only talks about how sandpaper affects wood, he shows you with pictures of objects magnified to 100 times their normal appearance so you can see exactly what your tools do to the wood.

A chapter on wood identification, a subject so popular that Taunton Press recently published a second Hoadley book, *Identifying Wood*, is devoted solely to the identification of the various species.

The Woodfinishing Book by Michael Dresdner, ©1992, Taunton Press Inc., Newtown, CT.

Though this book's focus is wood finishing rather than wood types, it has plenty of valuable information about certain finishes on certain woods.

If you need to know why maple is a difficult species to dye or why red oak may be difficult to oil or how ultra–violet light affects wood with rich initial coloring, this is the reference book for you. Unfortunately, specific wood species are only addressed anecdotally and specific information on a particular wood species is difficult to find here.

Still, I find this book extremely valuable in steering me in the general direction of good wood finishes for a given species. Remedies for open–pore wood, knots, bleeds, mistakes and a variety of other wood finishing maladies are discussed at length as well.

Wood Handbook: Wood as an Engineering Material, Agricultural Handbook #72 by Forest Products Laboratory, Forest Service, USDA, revised 1987, U.S. Government Printing Office, Washington, DC.

If I had to choose one book on the subject of various wood types, this would be my choice. Though some may find the reading dry, it's jam–packed with objective information.

Much of the information is in the form of tables, which makes it very easy to compare the same characteristics of different domestic wood species. With detailed cross–referencing, you'll be able to compare the relative hardness of southern magnolia to eastern cottonwood, to name only two. From quantifying paintability to machining properties, to common uses, this handbook is nearly 500 pages of wood types, graphs, photos, sketches and formulae. Whether the wood is green or dry, common or rare, standing in the forest or spinning on the lathe, everything you've ever wanted to know about wood is contained in this book.

Tropical Timbers of the World: Agricultural Handbook #607 by Martin Chudnoff, Forest Products Laboratory, Forest Service, USDA, 1984, U.S. Government Printing Office, Washington, DC.

This is a book of possibilities, more than most woodworkers would ever dream of. In it are over 400 varieties of foreign–grown woods that are commonly logged for lumber. It's positively mind–boggling.

Engineering information and properties such as shrinkage, rot resistance, weight, strength and the like are quantified for each species. Information on the common uses of each wood type is also included.

The listings and comparisons are not quite as detailed as the *Wood Handbook* mentioned earlier. But for anyone looking for odd, unusual or interesting new woods to work with, this book will definately show you where to start.

***Ken Textor** works wood and writes about it in Arrowsic, Maine.*

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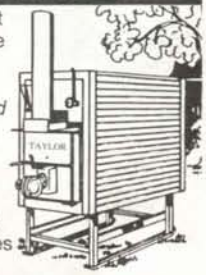

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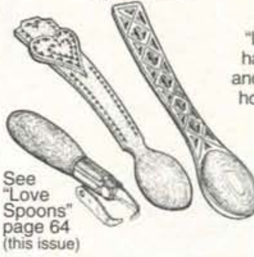

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Calendar

If your group is having an event you would like other woodworkers to hear about, please send us all pertinent information at least three months before the opening date. We will publish it for you in "Calendar" free of charge.

California

The No. California Woodworking Show: (11/5–7) San Mateo Expo Center, Fiesta Hall, 2495 S. Delaware Street, San Mateo, CA 94403

Contact: The Woodworking Shows, Tel. 800-826-8257

The So. California Woodworking Show: (12/3–5) L.A. County Fairlplex, Building 5, White & McKinley Avenues, Pomona CA 91768

Contact: The Woodworking Shows, Tel. 800-826-8257

Connecticut

Workshops In Fine Craftsmanship: (11/13–14) Making Windsor Stools (11/20-21) More Band Sawed Boxes (11/20-21) Brookfield Craft Center, Inc., Brookfield & South Norwalk, CT

Contact: Brookfield Craft Center, Tel. 203-775-4526 in Brookfield, 203-853-6155 in Norwalk

Delaware

Art From The Lathe: (4/3–11/30) Hagley Museum and Library, Wilmington, DE

Contact: Dorothy Lehr, Public Relations Coordinator, P.O. Box 3630, Wilmington, DE 19807, Tel. 302-658-2400

Florida

Florida Woodworking Show & Furniture Supply Show®: (11/16–17) Orlando,FL

Contact: Eidson Trade Shows, Inc., P.O. Box 609, Conover, NC 28613, Tel. 704-459-9894

Illinois

The Chicagoland Woodworking Show: (10/15–17) Odeum, South Hall, 1033 N. Villa Avenue, Villa Park, IL 60181

Contact: The Woodworking Shows, Tel. 800-826-8257

23rd Annual Midwestern Carver's Show: (11/6–7) Belle–Clair Exposition Hall, 200 South Belt East, Belleville, IL 62221

Contact: Don Lougeay, 1830 East "D" Street, Belleville, IL 62221, Tel. 618-233-5970

Indiana

Mid American Lumbermen's Show®: (2/11–12/94) Allen County Memorial Coliseum, 4000 Parnell Avenue, Fort Wayne, IN 46805

Contact: Eidson Trade Shows, Inc., P.O. Box 609, Conover, NC 28613,Tel. 704-459-9894

Maryland

Sugarloaf Craft Festival: (4/15–17/94) Montgomery County Fairgrounds, Gaithersburg, MD

Contact: Sugarloaf Mountain Works, Inc., 200 Orchard Ridge Drive, Suite 215, Gaithersburg, MD 20878, Tel. 301-990-1400

Sugarloaf Craft Festival: (4/29—5/1/94) Maryland State Fairgrounds near Baltimore, MD

Contact: Sugarloaf Mountain Works, Inc., 200 Orchard Ridge Drive, Suite 215, Gaithersburg, MD 20878, Tel. 301-990-1400

Massachusetts

Woodworking Show: (10/15–17) Eastern States Exposition, W. Springfield, MA

Contact: The Show, 24 East Avenue #173, New Canaan, CT 06840, Tel. 800-287-7891

Michigan

The Metro–Detroit Woodworking Show: (10/22–24) Michigan Fairgrounds, Community Arts Building, 1120 W. State Fair Avenue, Detroit, MI 48203

Contact: The Woodworking Shows, Tel. 800-826-8257

Fruitbelt Woodcarver's Show: (11/6–7) Cook Energy Information Center, I–94, Bridgman Exit 16, 3½ miles north on Red Arrow Hwy.

Contact: Dolly Krieger, Tel. 800-548-2555

Midwest–Grand Rapids Woodworking & Furniture Supply Fair®: (11/4–5) Grand Rapids, MI

Contact: Eidson Trade Shows, Inc., P.O. Box 609, Conover, NC 28613, Tel. 704-459-9894

New York

The Ideal Home: 1900–1920: (10/21–2/27/94) The American Craft Museum, 40 West 53rd Street, New York, NY 10019

Contact: Joan McDonald, Public Relations, Tel. 212-956-3535, FAX 212-459-0926

Woodworking Show: (11/12–14) Yonkers Raceway, Yonkers, NY

Contact: The Show, 24 East Avenue #173, New Canaan, CT 06840, Tel. 800-287-7891

"Christmas, '93 Art & Craft Spectacular": (12/3–5) New York State Fairgrounds, Syracuse, NY

Contact: United Craft Enterprises, Box 326, Masonville, NY 13804, Tel. 607-265-3230

North Carolina

Woodworking Show: (11/19–20) Charlotte Convention Center, Charlotte, NC

Contact: The Show, 24 East Avenue #173, New Canaan, CT 06840, Tel. 800-287-7891

Ohio

Woodworking Show: (10/22–24) Cuyahoga County Fairgrounds, Berea, OH

Contact: The Show, 24 East Avenue #173, New Canaan, CT 06840, Tel. 800-287-7891

Woodworking Show: (1/14–16/94) Veterans Memorial Hall, Columbus, OH

Contact: The Show, 24 East Avenue #173, New Canaan, CT 06840, Tel. 800-287-7891

Oregon

The Oregon Woodworking Show: (11/19–21) Portland Expo Center, Exhibit Hall C, 2060 N. Marine Drive, Portland, OR

Contact: The Woodworking Shows, Tel. 800-826-8257

Pennsylvania

Valley Forge Crafts Festival: (11/13–14) Valley Forge Exhibit Center, King of Prussia, PA

Contact: United Craft Enterprises, Box 326, Masonville, NY 13804, Tel. 607-265-3230

Rhode Island

Conservation By Design: (10/93–1/94) Exhibition of wooden objects. Rhode Island School of Design, 2 College Street, Providence, RI 02903

Contact: Rick Goff, Tel. 401-454-6350

Tennessee

Woodworking Show: (10/29–31) Knoxville Civic Coliseum, Knoxville, TN

Contact: The Show, 24 East Avenue #173, New Canaan, CT 06840, Tel. 800-287-7891

National Conference "As A Professional In The Crafts": (10/20–23) Conferences & exhibitions. Arrowmont School of Arts and Crafts, 556 Parkway, Gatlinburg, TN

Contact: Registrar, Arrowmont School of Arts and Crafts, P.O. Box 567, Gatlinburg, TN 37738, Tel. 615-436-5860

Washington

The Western Washington Woodworking Show: (11/12–14) Western Washington, Seattle Center Exhibition Hall, Mercer Street at 3rd Avenue N., Seattle WA 98109

Contact: The Woodworking Shows, Tel. 800-826-8257

Washington, DC

The 12th Annual Smithsonian Craft Show: (4/14–17/94) Andrew W. Mellon Auditorium, 1301 Constitution Ave. N.W., Washington, DC

Contact: Office of Public Affairs, Smithsonian Institution, Washington, DC 20560, Tel. 202-357-2627

Decatur House Presents Marketplace for 19th Century Crafts:(11/5–7) Decatur Carriage House, 1610 H Street, N.W., Washington, DC 20006

Contact: Sarah Saville Shaffer, Tel. 202-842-0915

Wisconsin

The Northeastern Wisconsin Woodworker's Guild presents the 11th Annual Spring Show: (2/19–20/94) Port Plaza Mall in downtown Green Bay, WI

Contact: Curt Andersen, 2942 Jack Pine Lane,Green Bay, WI 54313, SASE, Tel. 414-434-1288

Canada

The Canadian Workshop Show/British Columbia Workshop & Hobby Show: (10/22-24) PNE Grounds, Vancouver, British Columbia

Contact: The Canadian Workshop Show, 130 Spy Court, Markham, Ontario, Canada L3R 5H6, Tel. 416-292-2784

Popular Woodworking's
CAPTION THE CARTOON
Contest sponsored by

DEWALT
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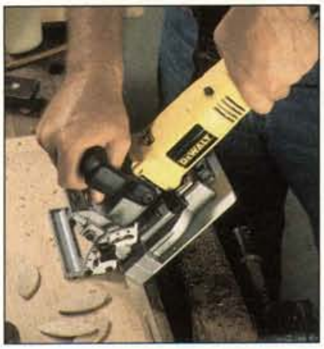
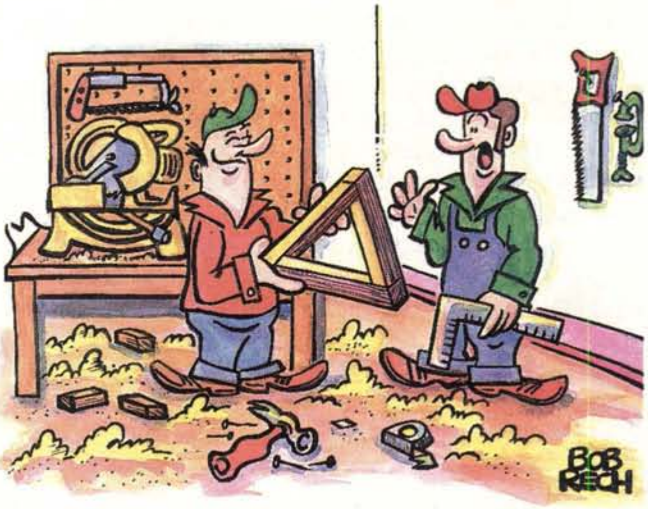
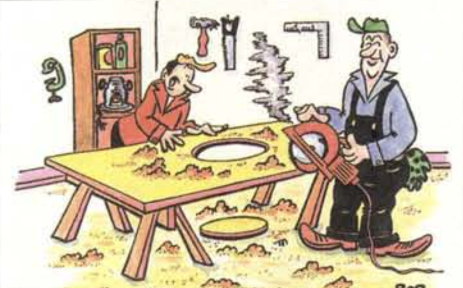
Readers are invited to submit their captions for this cartoon to Popular Woodworking, Cartoon Caption #3, 1041 Shary Circle, Concord, CA 94518. The deadline for entries is December 1, 1993. The entries will be judged by the woodworking staff. A winner and two runners up will be chosen.

The two runners up will each receive a one year subscription to *Popular Woodworking*. The winner will receive the new DeWalt Plate Joiner, model DW682K. State–of–the–art features include: integral tilting fence with rack–and–pinion height adjustment; retractable steel anti–slip pins on the base; a 6.5 amp, gear driven 100 percent ball bearing motor; and a top handle for added control. Additionally, the Plate Joiner comes with a one–year free parts, labor and loaner tool warranty.







"No, George—I needed a hole saw for my door; not a hole sawed in my door!"

AND THE WINNER IS...

The winner of our first "Caption The Cartoon Contest" in the July 1993 issue, and recipient of the DeWalt DW682K Plate Joiner shown above is:

Tony Servies, from Greenback, Tennessee

The runners up recieve a one year subscription to *Popular Woodworking*:

Ival Williams, from Spring, Texas

"I told you not to plug that into 220 volts!"

Carolyn Thomas, from Highland Springs, Virginia

"That's fine Tim, but the sink's square!"

by Ken Textor

Mythology: Wood's Fourth Dimension

Bill was speaking in low, reverential tones, as if seated in the last pew of a medieval cathedral. His monologue, though, was intense: "For me, working with wood is spiritual. I mean, here I take something that's alive, take its life away, re-shape it to what I want and make it come alive again as something else. It's like you're a god!"

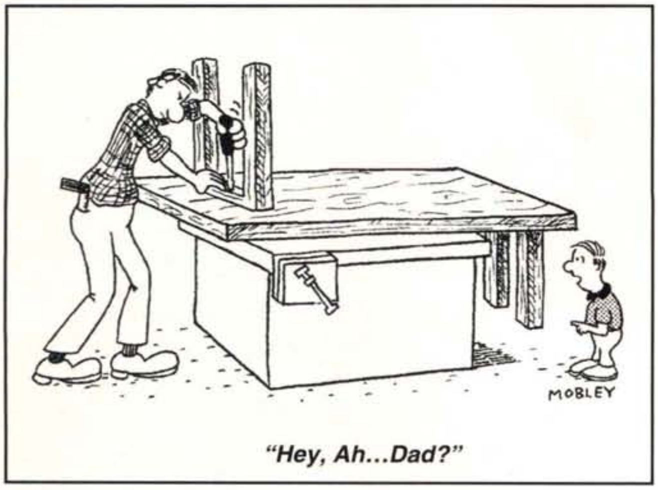
Well, maybe. Bill is one of my more philosophic woodworking friends. But he isn't alone in his feelings for working with wood. For years, I've heard a similar urgent zeal from both new and old woodworkers. It's more than a love of the craft. It's devotion. On good days, I even feel it myself.

Then what is it about wood that inspires people so? Why is there almost a religious commitment for many involved in woodworking? Do we just need better ventilated finishing rooms?

In trying to find some answers to these questions, I've stumbled on a whole extra dimension to woodworking. It seems that we come by our ardent feelings honestly. The whole idea of wood being something sacred stems from a tradition that pre-dates the great religious myths of Egypt, Greece and Rome. Essentially, what I found was this: Wood was humanity's first inspiration. Wood and its source the tree, have been the basis of nearly all prehistoric religions, not only in Europe, but in the East, in Africa and the Americas as well. Trees sure do get around.

For a woodworker like myself, this has been a fascinating discovery. Take, for instance, the mythology of a common wood like birch: Ancient Celtic cultures of northern Europe believed *birch* was capable of giving hope, assuring successful beginnings and driving away evil spirits. Thus, a project like making an infant's first cradle out of birch might assure a child of being free of demons throughout life. Too bad no PullOut™ Plans survive from those days.

Most scholars of ancient wood mythologies theorize that the birch was a symbol of successful beginnings because it is among the first trees to set out leaves in the spring. But as a woodworker, I can think of other reasons why birch was first.



"Hey, Ah...Dad?"

To begin with, it's an easy wood to work and extremely versatile. Even using very primitive tools, birch splits fairly straight and carves relatively easy. Green birch is easily bent, making it a prime candidate for building temporary, arch-shaped huts and because birch bark is impervious to water, it is an excellent choice for bowls, paper, or canoes.

Most other woods have similar mythologies. Ancient Scandinavians believed an ash tree held the entire universe together, and that the earth was created from its roots, the sky from its branches and man from the wood of its trunk. Ash was also believed to be a charm against drowning and was frequently used in boat construction. In steam-bending, few hardwoods are as easy to coax into place as ash. Combining flexibility, strength and toughness, ash is still prized today, as it was near the dawn of history, as the wood for making oars.

And on it goes. Oak was considered the king of all woods and inspired the widespread religious cult of the Druids. Though more famous for their connection to rock monoliths like Stonehenge, the Druids also venerated oak as a symbol of strength and as a doorway to the gods. Even the name "druid" translates as "wise men of the oak."

Woods like elm, fir, willow, holly, poplar, and yew all have importance in European mythology. But reverence for wood extends even into Native America where birch was burnt to keep thunderstorms under control, or ancient China where pine was considered a means to immortality.

Wood mythology even creeps into modern religions through the recurrent symbol of the Tree of Life. Buddha was inspired to conceive his religion under a fig tree. Christianity began with Adam and Eve under an apple tree, eating its forbidden fruit. The Jewish menorah (a sacred candelabra) is a symbolic tree.

For me, though, this extra dimension to woodworking has given me something useful to contemplate while planing another hundred board feet of maple. I've spent hours with my woodworking friends, speculating on both the practical and primitive religious reasons why a particular wood was consecrated for a certain purpose. One good source for wood mythologies has been Robert Graves' book *The White Goddess.*

Though historians like to call our period of pre-civilization The Stone Age, I prefer to think of it as The Wood Age. As a central fact of primitive life, wood was paramount. In any case, wood and woodworking now give me a much clearer understanding of history and civilization, and learning history through the extra dimension of wood mythology sure beats those soporific "World Civilization" classes of my high school days. PW

While other geniuses have been out collecting their Nobel Prizes, ours have been experimenting in the basement again.

They look harmless enough. But send these men to the basement at Ryobi R&D, and they go wild. This year, it all started with the new OSS450 Oscillating Spindle Sander – the first in its price range to combine up-and-down and rotary motion for burn-free finishes on a huge array of shapes and contours. Which led to the new BS900 Band Saw for more intricate cuts and 9″ capacity. Ah, then came the TDS4000K – the only cordless drywall and deck screw gun to operate at pro-standard 4000 rpm's. The RA202 Radial Arm Saw, with its patented Control Cut™ feature for operator-selected saw head advance and automatic return. Our ever-popular Detail Sander. And the handy AP12 Portable Planer with its quick blade changes and lateral adjustment of knives to eliminate scoring. Fact is, whatever the tool – benchtop, cordless or handheld – some Ryobi genius is always finding a refreshingly better, more accurate and efficient way to get the job done. Are they really mad scientists? Probably not. Are they coming up with products you'll be crazy about? You bet.

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- PRECISION FENCE + MITRE GAUGE

REG: $1,190.00
SPECIAL: $1.135.00

12" PLANER

EN-PN12
- 2HP 16 AMPS 110V 16,000 CPM
- 2 BLADE CUTTERHEAD
- 26.2 FPM FEED RATE

REG: $380.00
SPECIAL: $355.00

15" PLANER

***EN-PN15**
- 2HP 110/220V 15 AMPS 220V
- 2 SPEEDS, 13,500 CPM
- 3 BLADE CUTTERHEAD
- STAND INCLUDED

PRICE: $795.00

WOOD SHAPER

***EN-WS05**
- 1HP 16 AMPS 110V
- REVERSIBLE MOTOR
- CAST IRON TABLE
- 1/2" SPINDLE

REG: $280.00
SPECIAL: $265.00

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22" SCROLL SAW

EN-SC22
- 1/8HP MOTOR
- SINGLE SPEED 1,725 SPM
- 22" THROAT, 2" MAX CUT

REG: $150.00
SPECIAL: $145.00

HEAVY DUTY WOOD SHAPER

***EN-WS10**
- 3HP 22 AMPS 220V
- 3/4"+1" SPINDLES
- 3" SPINDLE TRAVEL
  (1/2" SPINDLE AVAILABLE)

REG: $860.00
SPECIAL: $845.00

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3H.P. DUST COLLECTOR

***EN-DC30**
- 3 HP 220 V 22AMPS
- 1850 CFM
- INTAKE HOLES: 3 @4"

REG: $455.00
SPECIAL: $450.00

16" BAND SAW

***EN-BS16**
- 1-1/2 HP 110/220V 3 SPEEDS
- CAST IRON TABLE
- RIP FENCE & MITRE GAUGE INCLUDED

REG: $520.00
SPECIAL: $490.00

18" HEAVY DUTY BAND SAW
***EN-BS18S**
PRICE: $645.00

18" SUPER HEAVY DUTY BAND SAW

***EN-BS18**
- 2HP 110/220V 11 AMPS 220V
- 3,300 FPM BLADE SPEED
- RIP FENCE & MITRE GAUGE INCLUDED

REG: $910.00
SPECIAL: $880.00

6" X 9" BELT/DISC SANDER

***EN-SN69**
- 3/4 HP 110/220 V
- 6" X 48" BELT,9" DISC
- TABLE TILTS: 0°-45°, BELT: 0°-90°
- WITH GAUGE

REG: $195.00
SPECIAL: $185.00

6" JOINTER

***EN-J006**
- 1HP 110/220V 14 AMPS 110V
- CAST IRON TABLE
- 13,500 CPM
- 3 BLADE CUTTERHEAD

REG: $340.00
SPECIAL: $300.00

8" HEAVY DUTY JOINTE
***EN-J008**
REG: $675.00
SPECIAL: $635.00

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